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BIENNIAL REPORT

OF THE

CALIFORNIA HIGHWAY COMMISSION

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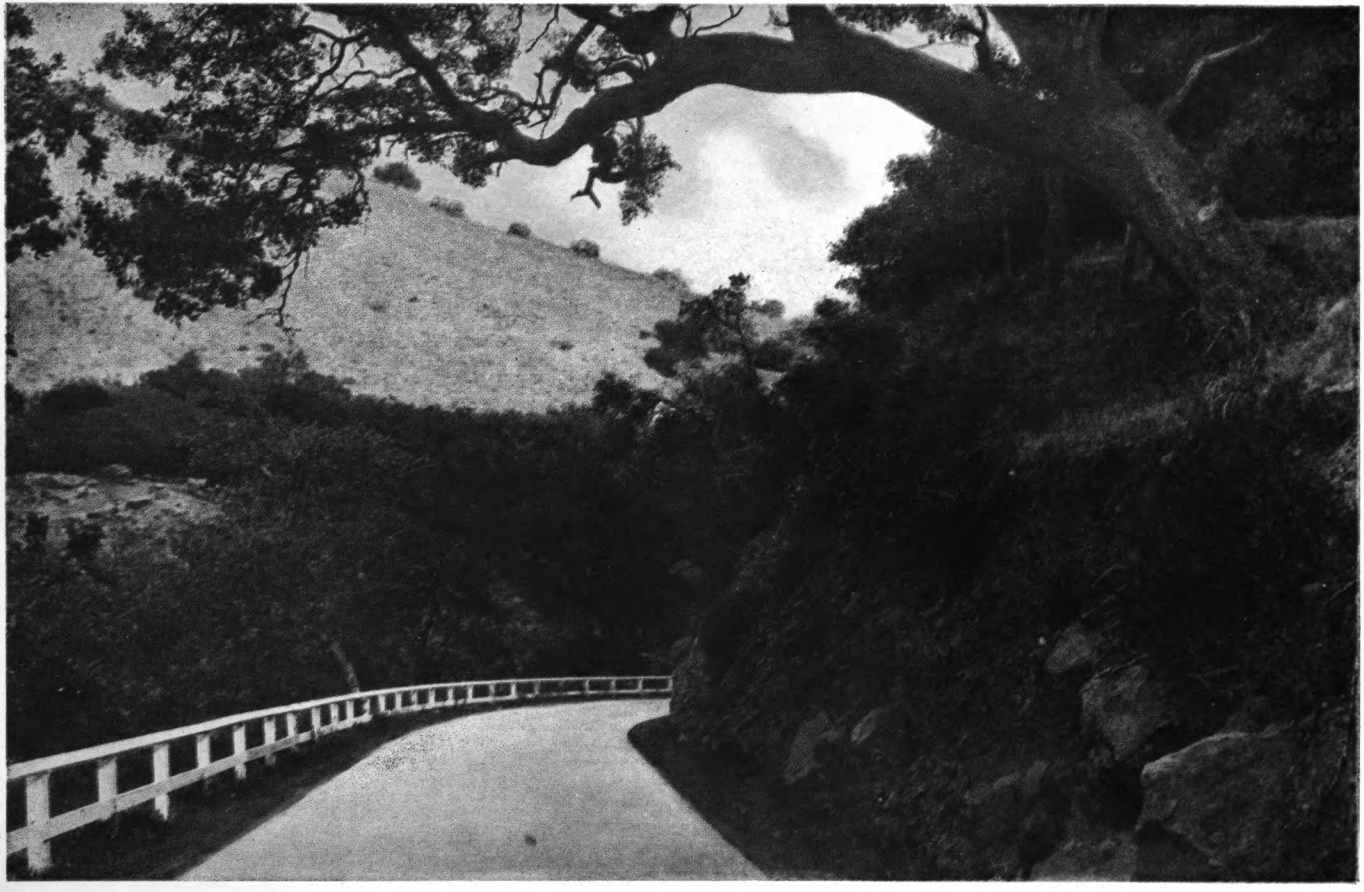
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A State Highway in Santa Barbara County.

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SECOND BIENNIAL REPORT

OF THE

California Highway Commission

A SUBDIVISION OF THE

Department of Engineering

OF THE

State of California

TO ACCOMPANY THE

Seventh Biennial Report of that Department
December 31, 1920

NEWELL D. DARLINGTON,
CHARLES A. WHITMORE,
GEORGE C. MANSFIELD,
California Highway Commission.

AUSTIN B. FLETCHER,
Highway Engineer.

C. C. CARLETON,
Acting Secretary.



CALIFORNIA STATE PRINTING OFFICE
SACRAMENTO, 1921

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CONTENTS.

	PAGE
Personnel of the California Highway Commission	6
Organization Chart	7
Functional Chart	8
Introductory	9
Fundamental Features of Road Work	9
Operation Problems Now to the Fore	11
Minimum Specifications Are Increased	11
Minimum Width of Highways	13
Betterments on the Old Roads	13
Highway Routes in Small Cities	13
Huge Increase in Building Costs	15
Where Additional Money Is Needed	15
Advisability of Gasoline Tax	17
Pay-As-You-Go or Another Bond Issue	17
Roads Included in State System	17
Maintenance Is Growing Problem	18
Stop Drainage on Highways	18
Fast Driving by Loaded Trucks	18
Distribution of Maintenance Costs	19
Contracts Preferred to Day Labor	19
Elimination of Grade Crossings	19
Beautification of Highway System	21
Preservation of the Redwoods	21
Highway Budget to be Followed	21
Convict Work on State Highways	21
Surplus War Equipment	22
Time Required to Build Roads	22
New Amendment Removes Handicap	23
Should State Make Its Own Cement?	23
Importance of Federal Aid Money	23
Study of State Highway System	25
Details of Work in Other Reports	25
Thanks Due to Governor Stephens	25
Co-operation Is Appreciated	25
The Value of Our Highways	25
APPENDIX A.	
Report of Highway Engineer to California Highway Commission	29
APPENDIX B.	
Legal Department	48
APPENDIX C.	
General Inspection of State Highways	55
APPENDIX D.	
Federal Aid Highways in California	59
APPENDIX E.	
Excess War Material from the Federal Government	65
APPENDIX F.	
Bridge Work on State Highways	75
APPENDIX G.	
Testing Department	81
APPENDIX H.	
Purchasing Department	85
APPENDIX I.	
The Accounting Department and Financial Statement	91
APPENDIX K.	
Convict Road Work in Division I	105
Convict Road Work in Division II	114

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APPENDIX L. PAGE
Preservation of Natural Scenic Beauties of State Highways in California 118

APPENDIX M.
State Highway Construction Through the Rice Fields of Butte County 122

APPENDIX N.
Votes on State Highway Bond Issues, 1910, 1916, 1919 and Amendment No. 9, 1920 127

APPENDIX O.
Analysis of Cement Purchases, 1918-1920 129

APPENDIX P.
Apportionment of Receipts by State Motor Vehicle Department, June 30, 1918, to July 31, 1920, inclusive 133

APPENDIX Q.
Contract Statistics 138

APPENDIX R.
Analysis of Maintenance Expenditures 149

APPENDIX S.
Map of California, showing State Highways (see pocket inside back cover)

ILLUSTRATIONS.

Frontispiece—A State Highway in Santa Barbara County. PAGE
PLATE I—State Highway, Sutter County, near Yuba City 10
PLATE II—State Highway, Alameda County, near Decoto 10
PLATE III—State Highway, Santa Clara County, near San Jose, Showing Widening of Highway with Concrete Shoulders, Heavy Topeka Surfacing Between 12
PLATE IV—State Highway, Santa Barbara County, in Gaviota Gorge 14
PLATE V—State Highway, Santa Cruz County, near Glenwood 14
PLATE VI—Bridge on State Highway, Monterey County, over Salinas River near King City 16
PLATE VII—State Highway, Kern County, near Tejon Pass, showing method of constructing half width of concrete base to allow passage of traffic 20
PLATE VIII—State Highway, Los Angeles County, showing super-elevation on the Ridge Route 24
PLATE IX—State Highway, Ventura County, Conejo Grade. Completed concrete base 24
PLATE X—State Highway, Marin County, heavy grading work, near San Rafael 26
PLATE XI—State Highway, Kern County, construction near Tejon Pass, showing reinforcement and constructing half-width of concrete base to allow passage of traffic 26
PLATE XII—Bridge on State Highway, Santa Barbara County, over Canada del Refugio 28
PLATE XIII—Bridge on State Highway, Shasta County, over Cottonwood Creek 28
PLATE XIV—State Highway, Santa Cruz County, near Glenwood 32
PLATE XV—State Highway, San Benito County, near San Juan Bautista 32
PLATE XVI—State Highway, Siskiyou County, near Dunsmuir 36
PLATE XVII—State Highway, Shasta County, near Castella 36
PLATE XVIII—State Highway, San Benito County, San Juan Grade 38
PLATE XIX—State Highway, Humboldt County, through the Redwoods 46
PLATE XX—State Highway, Trinity County, near Helena 46
PLATE XXI—A Portable Oil Heating Plant of the California Highway Commission 50
PLATE XXII—A Typical Maintenance Yard of the California Highway Commission 50
PLATE XXIII—State Highway, Los Angeles County, on the Ridge Route 54
PLATE XXIV—Bridge on State Highway, Santa Barbara County, over Gaviota Creek 58
PLATE XXV—Bridge on State Highway, Mendocino County, over Red Mountain Creek 58
PLATE XXVI—State Highway, Santa Cruz County, near Glenwood 62
PLATE XXVII—Bridge on State Highway, Shasta County, over Dog Creek 64
PLATE XXVIII—State Highway, Santa Barbara County, in Gaviota Gorge 64
PLATE XXIX—State Highway, Mono County 66
PLATE XXX—State Highway, Mono County, under construction 68
PLATE XXXI—State Highway, Mono County 68
PLATE XXXII—Bridge on State Highway, Santa Barbara County, over Arroyo Honda 72

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		PAGE
PLATE XXXIII	—State Nursery Plant being installed near Davis, California, by joint cooperation of the California State Forestry Department and the California Highway Commission, for the production of trees to be planted along highways of California	76
PLATE XXXIV	—State Highway, Division Office Building, Willits, Mendocino County, California	80
PLATE XXXV	—Powder Magazine, San Luis Obispo County	80
PLATE XXXVI	—State Highway, Yolo County, Davis Underpass	82
PLATE XXXVII	—State Highway, Kern County, near Bakersfield. Constructing half-width of base to allow passage of traffic	86
PLATE XXXVIII	—State Highway, San Mateo County, near San Francisco	86
PLATE XXXIX	—State Highway, Los Angeles County, on the Ridge Route, showing day-lighting of slopes on curves	88
PLATE XL	—State Highway, Shasta County, near Hazel Creek	92
PLATE XLI	—State Highway, Shasta County, near Baird	92
PLATE XLII	—State Highway, Los Angeles County, on the Ridge Route	94
PLATE XLIII	—State Highway, Siskiyou County, Black Butte Overgrade Crossing	96
PLATE XLIV	—Bridge on State Highway, Sierra County, over North Fork Yuba River	96
PLATE XLV	—State Highway, Humboldt County, near Bear Creek	100
PLATE XLVI	—Convict Camp, Mendocino County, near Laytonville	104
PLATE XLVII	—State Highway, convict work in Mendocino County	104
PLATE XLVIII	—State Highway, Mendocino County, team outfit at work, all convicts	108
PLATE XLIX	—State Highway, Convict Camp, Sierra County	110
PLATE L	—State Highway, Sierra County, convict work near Downieville	110
PLATE LI	—State Highway, Shasta County, near Castella	112
PLATE LII	—Bridge on State Highway, Siskiyou County at Dunsmuir	112
PLATE LIII	—Bridge on State Highway, Imperial County, over Myers Creek	116
PLATE LIV	—Bridge on State Highway, Shasta County, over Pit River	116
PLATE LV	—State Highway, Ventura County, near Ventura	120
PLATE LVI	—State Highway, Imperial County, on the desert	120
PLATE LVII	—On Route of State Highway, Humboldt County, showing destruction of the Redwoods	124
PLATE LVIII	—State Highway, Humboldt County, showing lumbering operations	124
PLATE LIX	—Proposed State Highway, Del Norte County, before construction, showing corduroy road	128
PLATE LX	—Weekend Campers Along State Highway in the Redwoods, Humboldt County	128
PLATE LXI	—Constructing Bridge on State Highway, Humboldt County, over Eel River, near Garberville	150
PLATE LXII	—Bridge on State Highway, Humboldt County, over Eel River, near Scotia	150
PLATE LXIII	—State Highway, Mendocino County, convict work	152
PLATE LXIV	—Bridge on State Highway, Shasta County, over Charlie Creek	152
PLATE LXV	—State Highway, Stanislaus County, near Riverbank. Preparing subgrade for concrete shoulders	156
PLATE LXVI	—State Highway, Stanislaus County, near Turlock. Laying asphalt surface	156
PLATE LXVII	—State Highway, San Diego County, near Oceanside	158
PLATE LXVIII	—On Route of State Highway, Siskiyou County, Mount Shasta in distance	158

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STATE OF CALIFORNIA

DEPARTMENT OF ENGINEERING

CALIFORNIA HIGHWAY COMMISSION

NEWELL D. DARLINGTON, Chairman.
CHARLES A. WHITMORE.
GEORGE C. MANSFIELD.

HEADQUARTERS OF THE COMMISSION: FORUM BUILDING, SACRAMENTO.

AUSTIN B. FLETCHER ---------- HIGHWAY ENGINEER
CHARLES C. CARLETON ---------- ATTORNEY AND ACTING SECRETARY
THOMAS E. STANTON, JR. ---------- ASSISTANT HIGHWAY ENGINEER
RUSSELL H. STALNAKER ---------- ASSISTANT HIGHWAY ENGINEER
WALTER G. HUNTER ---------- ASSISTANT HIGHWAY ENGINEER
ALLAN J. WAGNER ---------- ASSISTANT HIGHWAY ENGINEER
H. E. WARRINGTON ---------- ASSISTANT HIGHWAY ENGINEER
W. J. GOUGH ---------- ASSISTANT HIGHWAY ENGINEER
LOWELL R. SMITH ---------- PURCHASING AGENT
HERMAN B. WEAVER ---------- CHIEF ACCOUNTANT

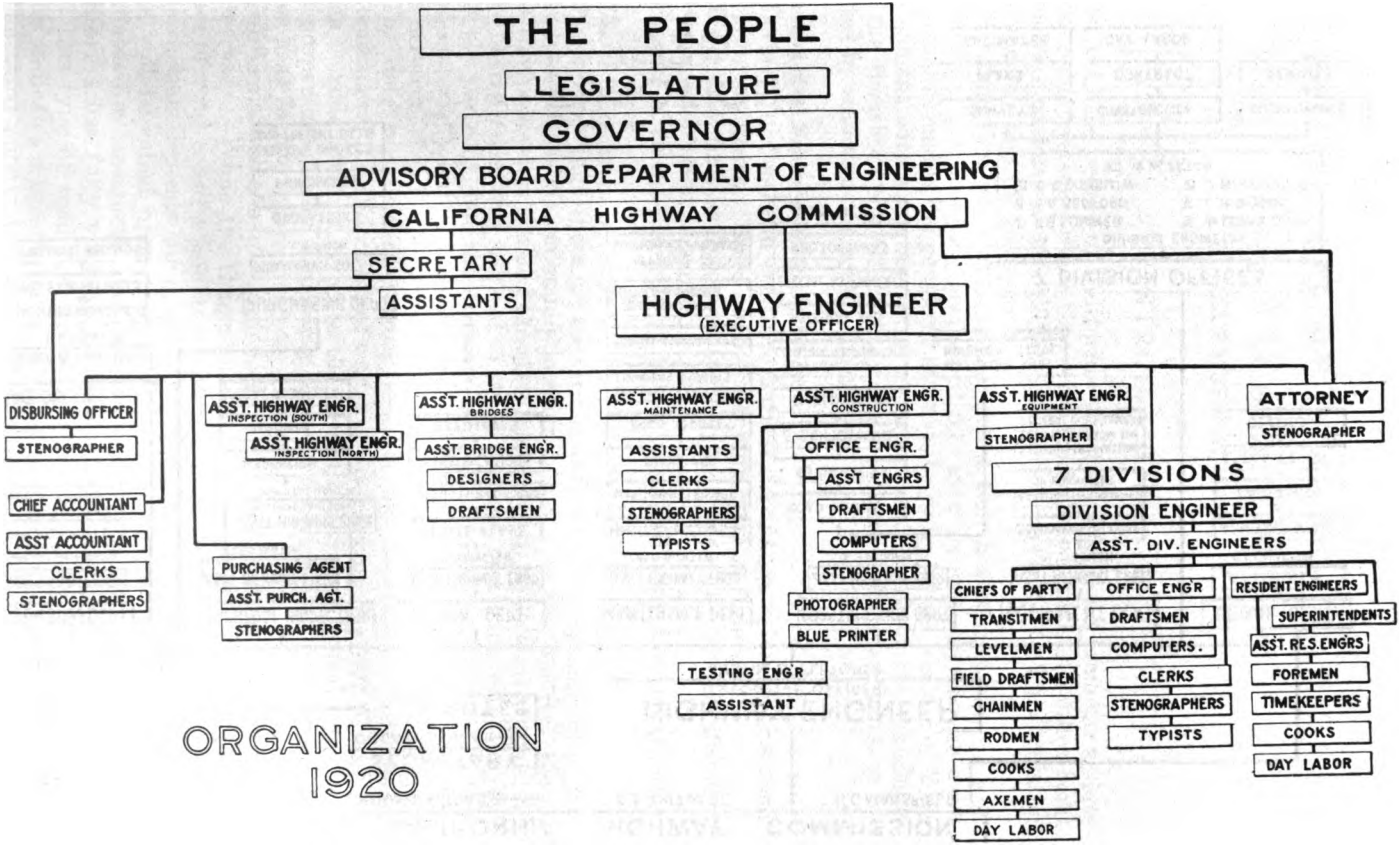
DIVISION OFFICES.

Division I. FRANCIS G. SOMNER, Division Engineer ---------- Willits, California
Division II. T. A. BEDFORD, Division Engineer ---------- Dunsmuir, California
Division III. GEORGE R. WINSLOW, Division Engineer, Fruit Building, Sacramento, California
Division IV. W. LEWIS CLARK, Division Engineer, Flood Building, San Francisco, California
Division V. LESTER H. GIBSON, Division Engineer, Union National Bank Building, San Luis Obispo, California
Division VI. J. B. WOODSON, Division Engineer, Rowell Building, Fresno, California
Division VII. W. W. PATCH, Division Engineer, 1111 Pacific Finance Building, Los Angeles, California

PAST MEMBERS OF THE CALIFORNIA HIGHWAY COMMISSION.

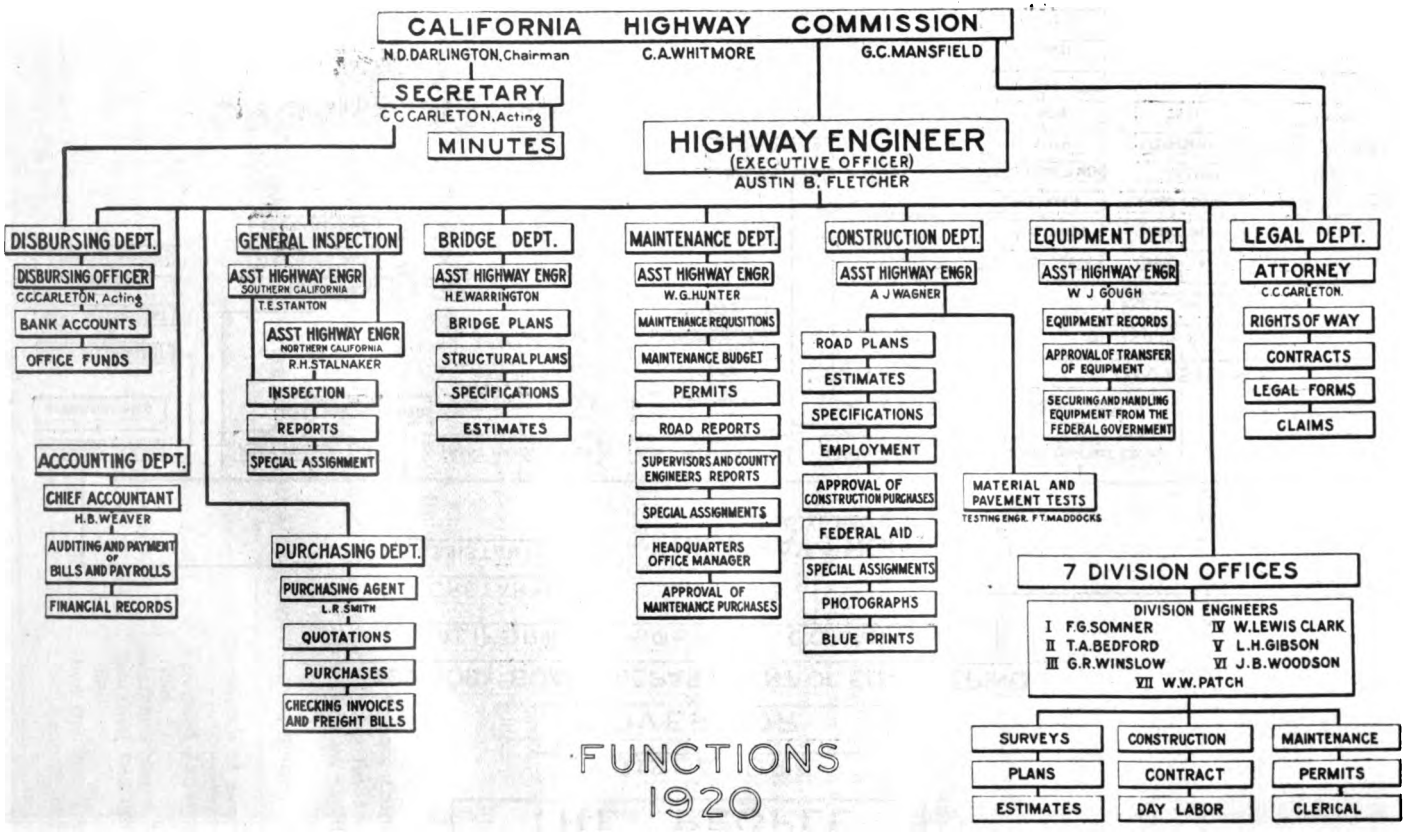
Name	Residence	Date of appointment	Termination of membership
Burton A. Towne	Lodi	August 2, 1911	Resigned January 15, 1914
Charles D. Blaney	Saratoga	August 2, 1911	Resigned March 1, 1917
Charles F. Stern	Eureka	January 15, 1914	Resigned December 21, 1918
Henry J. Widenmann	Vallejo	March 1, 1917	Died October 6, 1918
Emmett Phillips	Sacramento	December 21, 1918	Died June 18, 1919

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FUNCTIONS
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BIENNIAL REPORT OF THE CALIFORNIA HIGHWAY COMMISSION.

DECEMBER 31, 1920.

INTRODUCTORY.

In 1910 the people of California voted the first bond issue for a state good roads system. Since that time from the original and other bond issues approximately $36,000,000 have been expended by California on the construction of this system.

The time that has elapsed, the amount that has been expended, and the service that has been performed now give a perspective to the work that should enable the people of the state to judge of the wisdom of their investment with some degree of certainty, and to enable the soundness of the theories upon which California pioneered its road work to be tested by standards of actual experience.

Fundamental Features of Road Work.

Certain fundamental features marked the inauguration of this road building program. These might be summarized as follows:

First—Routing to follow as far as practicable the shortest distance between established termini.

Second—Cement concrete to be the standard type for construction of a road base.

Third—Roads to be built on the unit plan.

We believe that there is no serious difference of opinion over the soundness of the Commission's location policy. In its practical operation this policy has enabled the state highways to be so located that not only have grades been reduced to seven per cent maximum with but few over six per cent, but the distance as against former county roads has been materially reduced despite the added distance that grade reduction has involved.

The determination of correct location has necessitated additional costs in surveying and rights of way, but this expense has been negligible when consideration is given to the immense saving in travel costs that the proper location of a highway assures, a saving that continues year after year for all future time.

California was one of the pioneers in the construction of cement concrete roads. While the Commission has no criticism to make of other types of road construction and with a full realization that the type of construction depends upon soil conditions, upon the service that the road will be called upon to perform, and upon the amount of money available for construction, we believe that the cement concrete road in California has fully vindicated the wisdom of its selection. The fact that this type of road base has been very generally adopted in other states indicates a substantial agreement with this position.

The third outstanding feature of early road construction was the adoption of what may be termed the unit plan in road building. This plan enables a highway to be constructed which can be thickened and

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Plate I. State Highway, Sutter County, near Yuba City.

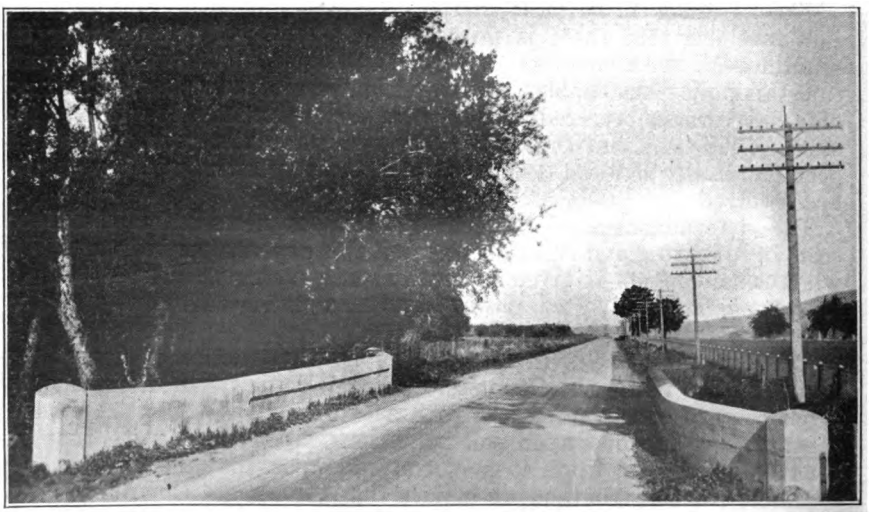


Plate II. State Highway, Alameda County, near Decoto.

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widened to meet larger traffic demands without the loss of the original investment. The four-inch fifteen-foot highway was sufficient for the travel for which it was built, and has taken care of an increase in traffic unthought of ten years ago. Even under the more intensive travel of today, this road is still meeting traffic needs over at least 90 per cent of the highway system. Under the stimulus of good roads, however, traffic near the large centers of population has now developed to the point that one of the pressing problems before California is that of thickening and widening these sections.

Under the unit plan of road construction, this can be accomplished without the loss of the original investment or the destruction of the original highway. The old road is included in and made an integral part of the wider and thicker highway.

This policy has resulted in giving to California a mileage in improved highways that could never have been built had roads been originally constructed to meet traffic demands of the far future, were it humanly possible to estimate either the extent or the character of such traffic. The added mileage thus secured has given to communities and counties all over California a good roads service, the value of which it is safe to say runs into millions of dollars.

Not only has this added mileage justified the Commission's construction policy, but it is further justified by the fact that the alternative policy of building completed roads would have cost the state millions of dollars without due return. Huge sums would have been tied up for years in an investment, which in large part would lie idle. The interest charge upon such idle investment would in itself amount to a huge sum.

Added to all this, is the undoubted fact that the good roads mileage built by the state have been the largest single factor in stimulating counties into campaigns for the improvement of local roads.

Operation Problems Now to the Fore.

During the ten years just passed the problems were largely those of construction. Construction problems still remain but they are now more closely allied with the operation and maintenance of the highways than with the methods and mechanics of construction.

While the roads that have been built are still taking care of travel in an adequate manner over at least ninety per cent of the highway system, yet the enormous increase in travel, both as regards the number of vehicles and the tonnage transported over the highways, is evidence that the traffic of the next ten years will require a heavier duty road.

Minimum Specifications are Increased.

In accordance with the early determined policy of the Highway Commission, *i. e.*, to make construction take care of present traffic and to reasonably anticipate future traffic growth, the Highway Commission has increased its minimum specifications from four inches of unreinforced concrete to five inches of reinforced concrete. Practically all construction under the $40,000,000 bond issue has been in accordance with these new specifications.

In this connection, it should be noted that the steel used in reinforcement and the extra inch of concrete have made a very material increase in the cost of constructing roads. We believe, however, that there can be no question of the wisdom of this expenditure.

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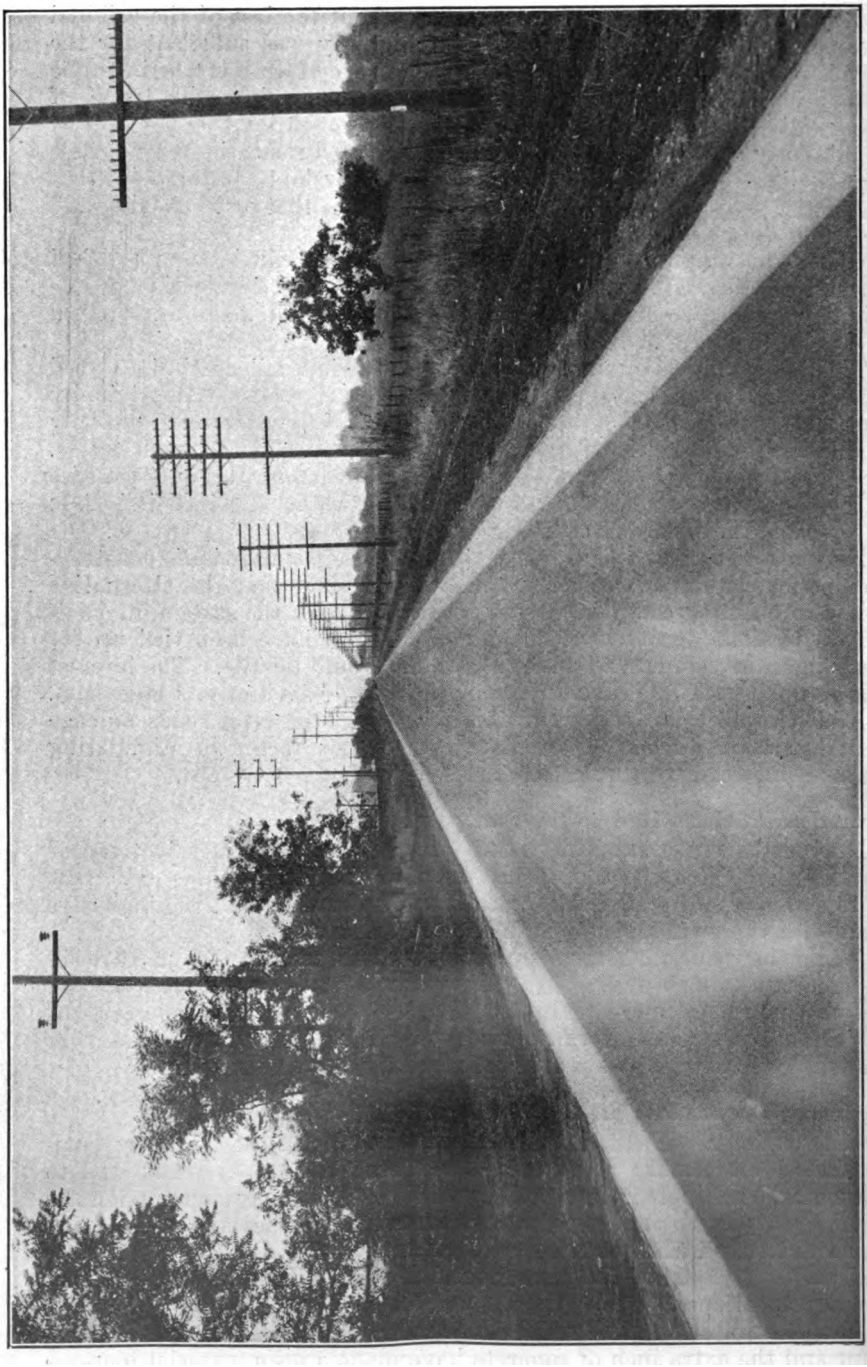


Plate III. State Highway, Santa Clara County, near San Jose, Showing Widening of Highway with Concrete Shoulders, Heavy Topeka Surfacing Between.

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Minimum Width of Highways.

The desirability of including in the specifications provision for a road of a minimum width from eighteen to twenty feet has been given very serious consideration by the Commission. It is the opinion of the Commission that to adopt a uniformly wider pavement than the fifteen-foot slab would reduce mileage to an extent not warranted by the service that the increased road width would give. It is the further belief of the Commission that the better plan for new construction is to build the wider pavement where the need for a wider road either now exists or will soon exist.

Betterments on the Old Roads.

The problem of the old road is that of widening and thickening where by reason of population or traffic congestion there is need for a heavier duty highway and of reconstructing in large part oiled macadam roads, originally constructed by counties, and later taken over by the state. The cost of maintaining the oiled macadam roads to which reference is made is so heavy that their reconstruction is the economical method of handling the problem.

The plan that has been followed by the Commission in widening and thickening the pavement has been twofold in character. In some places a second concrete slab has been placed over the original slab. In other places concrete shoulders have been built 1½ inches higher than the original slab and the trough thus made filled with asphaltic surfacing.

At the present time the Commission is building a five-inch oiled macadam road using the original concrete slab as a foundation on certain sections in the rice growing district, where, owing to inundation of the roadbed from adjacent rice fields, disintegration occasioned by alkali salts carried in solution in this water and the excessive loads hauled on the roads, the concrete slab has been broken into fragments.

Highway Routes in Small Cities.

Another construction problem has to do with the highway system in the smaller cities of the state.

The extension of the trunk system is emphasizing the failure of a number of municipalities to improve the portion of the state highway lying within their limits. The policy of the Highway Commission has been to require the municipalities to accept the burden of improving the highway lying within their boundaries. This policy has not only served to encourage many cities to launch upon programs of street improvement, but it has also obviated the necessity of these cities surrendering the jurisdiction over their state highway streets. Under the law the Highway Commission must have complete jurisdiction over all portions of the state highway system. The advantage of local control over local streets is so obvious that cities generally have preferred to pave the highway within their limits rather than abandon control of these streets. There are, however, in California a number of small municipalities, many of them with unduly extended limits, which are financially unable to improve the streets over which the state highway is routed. To these cities aid must be extended. The plan adopted by the Highway Commission has been to share the improvement with the municipality. Generally the municipality has agreed to pave the street through the

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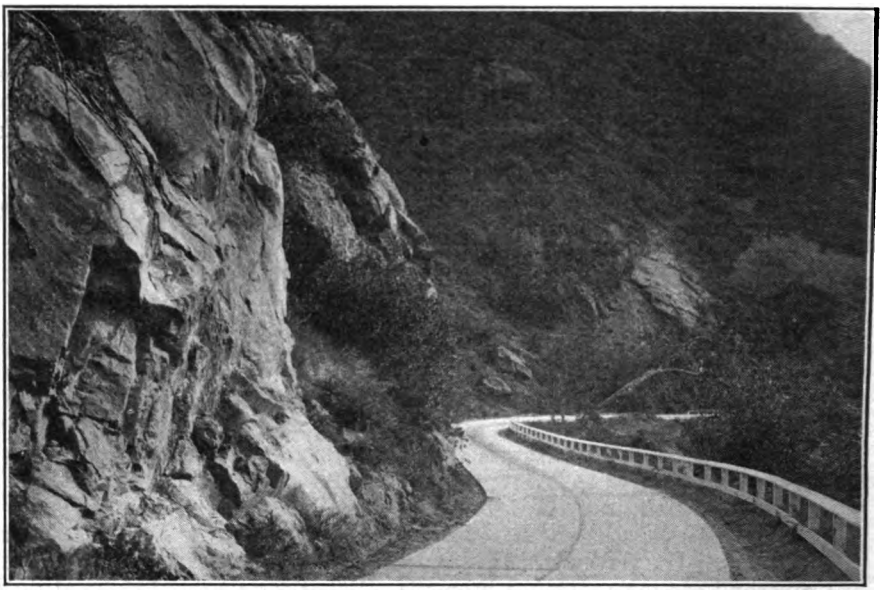


Plate IV. State Highway, Santa Barbara County, in Gaviota Gorge.

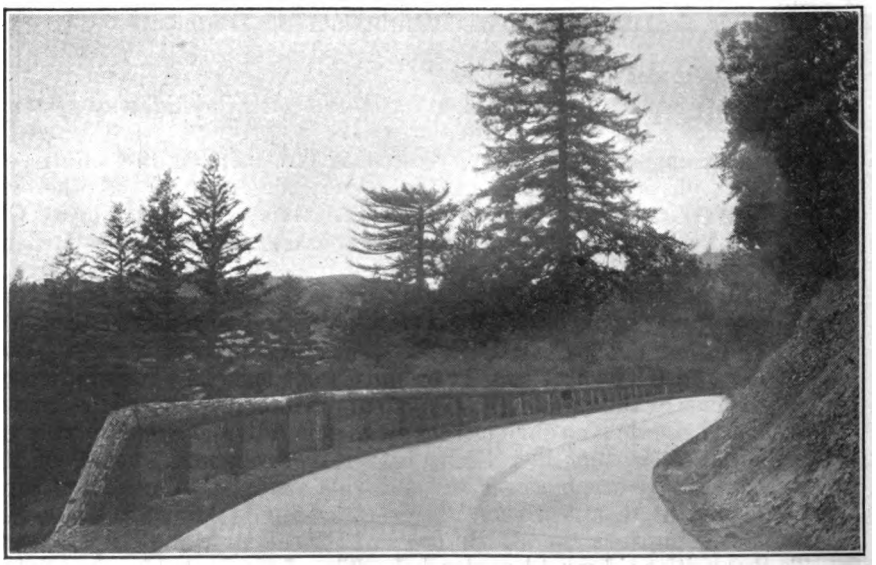


Plate V. State Highway, Santa Cruz County, near Glenwood.

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business district and the more settled residence section, where the frontage has a sufficient valuation to justify the improvement. Through the more unsettled portions of the city, the jurisdiction of the street has been surrendered to the Highway Commission, and the state has constructed the road.

However, only a beginning has been made in this work. There are a number of small municipalities now anxious to enter into such a cooperative improvement plan. The convenience of the public requires the improvement of these streets. Through travel in particular chafes under the condition of streets in many of these small cities. No funds, however, have been provided for carrying on this work on the scale on which it should be undertaken. In any future financing program, money to take care of this phase of highway construction should be included.

Huge Increase in Building Costs.

The Highway Commission would suggest that there is need at this time of the most careful thought relative to the financial program for highway construction.

In common with everything else, the cost of building highways soared to unthought of heights not long after the ratification of the $40,000,000 bond issue by the electors. To safeguard its funds and to avoid competing too actively with private enterprise in the labor market, the Highway Commission early abandoned plans for a large building program in 1919 and 1920 and confined its activities to roads of primary importance. Collapse of the market for state highway bonds necessitated even a more drastic curtailment of program. As a result of the policy of marking time during an unfavorable building period the Commission has emerged into a more favorable period with its funds well intact.

It is evident, however, that the $40,000,000 will not do the work that was mapped out for it. How far the bond issue will fall short of completing the system is hard to determine until cost conditions become stabilized and estimates become more than mere "guesstimates." The one thing certain, however, is that the money and bonds on hand will not complete the construction originally contemplated and authorized.

Where Additional Money is Needed.

Referring back to previous portions of the report, we might summarize the need for increased revenues as follows:

1. To complete the highway system.
2. To reconstruct oiled macadam roads built by counties and taken over by the state.
3. To widen surface and thicken highways in those places where the need of a heavier duty road is either now present or will soon arise.
4. To aid in constructing the state highway through small municipalities financially unable to undertake this construction themselves.
5. To defray the cost of the increased specifications adopted since the $40,000,000 bond issue was voted.

It should be noted that the $40,000,000 bond issue had no thought of providing funds for any of the purposes outlined above, other than the first named. And yet to protect the investment that California has made in its roads and to secure the maximum of service from these roads, it is important that immediate attention be given to these phases of the highway problem.

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Plate VI. Bridge on State Highway, Monterey County, over Salinas River near King City.

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The Commission would suggest that consideration be given to the wisdom of providing a special fund, in addition to present funds, to be expended in completing the present system; in widening, thickening and surfacing present roads; in reconstructing the old county oiled macadam roads now included in the state system; and in assisting in building state highways through small municipalities that are financially unable to undertake the work themselves.

Advisability of Gasoline Tax.

In this connection the Highway Commission would respectfully suggest that a tax on gasoline offers what appears to be a feasible method of raising such needed revenue.

It is worthy of note that such a tax would involve a very small collection expense and further that the burden imposed by the tax would automatically distribute itself among those benefitting by the highway in proportion to the measure of such use.

The suggestion of Secretary of the Treasury Houston that the federal government impose a tax on gasoline would indicate the importance of the early occupation of this field by the state government. The practicability of the tax has been amply demonstrated, notably in Oregon.

Pay-as-You-Go or Another Bond Issue.

It is the belief of the Commission that with such a fund, raised by an annual levy imposed as the discretion of the Governor and the Legislature may direct, and with the probable continuation of federal aid, the California highway system can be financed to completion without another bond issue; provided that no large new program of highway construction be undertaken.

The adoption of a "Pay-as-You-Go" plan, in the opinion of the Commission, would not delay the highway building program of the state so that undue hardship would result to any county or community. On the contrary, it would hasten the completion of the highway system, as the assurance of added revenue would enable contracts to be let that now must be held up if more money is not available.

At the same time the saving in interest charges alone would cut in half the final costs of highway construction to the taxpayers of the state.

Roads Included in State System.

It is the opinion of the Commission that the success of such a plan will depend upon whether in the opinion of the people of the state the present state highway system, including the roads built and projected, can be considered as approximately complete. This in turn depends upon whether it is the intention of the people of California and the desire of the Governor and the Legislature of the state to embark upon a program which will involve the construction by the state of local roads, or whether it is intended to confine state activity to trunk roads.

The counties of the state have shown a willingness and the ability to construct their own local roads. It is the belief of the Highway Commission that the type and time of improvement of local roads should be left to local decision, and their administration to local control. We would urge the advisability of scrutinizing closely all new road projects offered for inclusion in the state highway system to determine whether

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they are properly trunk roads, which should be built by the state, or roads of local concern and importance which should be built by the counties.

If the state confines itself to the construction and maintenance of roads of trunk line importance, it is the belief of the Commission that the future growth of the highway system and the betterment of the present system can be successfully accomplished under a "Pay-as-You-Go" plan. At least such a plan is worthy of trial.

Maintenance is Growing Problem.

As the mileage of state highways grows, the traffic demand increases, and the highway ages, maintenance assumes increased importance. While the law permits maintenance funds to be used for improvement of the highway as well as for maintenance proper, there can be no question but that maintenance funds should be expended in maintenance work.

Closely allied with the problem of maintenance is that of widening and thickening the highways near the population and traffic centers, the reconstruction of roads that for any reason have failed, and particularly the reconstruction of oiled macadam roads originally taken over from the counties.

Increasing attention is being given to maintenance problems. The monthly conferences of division engineers are serving as a clearing house of information as to maintenance methods. While division engineers are responsible for maintenance in their divisions, the roads are inspected and reported upon by assistant engineers who are responsible and report directly to the Chief Engineer and the Commission. These reports have been of great assistance in the work of maintenance supervision.

The chief factor in good maintenance is to repair a failure before it has had opportunity to develop. And in highway work, the best insurance against heavy maintenance costs is substantial construction of the road and its proper protection.

Stop Drainage on Highways.

More stringent regulations for the protection of the highway system are needed. We particularly would urge that legislation be enacted to require rice growers to keep drainage water from their fields off the highway right of way. In certain sections the highway has been converted into a veritable marsh by such water. No type of hard surfaced road can be maintained under such conditions. This practice has cost the state hundreds of thousands of dollars. The present law which provides for recovery after the damage has been done has proved inadequate to deal with the abuse. It is time that action is taken to stop the flooding of state highways, and their consequent destruction.

Fast Driving By Loaded Trucks.

Overloading of trucks and reckless speeding by drivers of loaded trucks is also endangering the state highways. The remedy for this is more adequate policing of state highways, and legislation to secure this is necessary. Experience in the enforcement of traffic laws convinces the Commission that best results can be obtained by the enforcement of

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traffic laws on state highways by a state police, the members of which are independent of local control and local influence.

In this connection consideration might be given to the substitution of pneumatic for solid tires upon all trucks operating on the state highway.

Distribution of Maintenance Costs.

The chief need for the heavier duty highway comes from the development of the truck and auto passenger traffic. We believe that present laws should be amended to place a larger burden of maintenance cost on this particular class of traffic.

Contracts Preferred to Day Labor.

In reestablishing active highway construction, the California Highway Commission will pursue its definite policy of doing work by contract rather than by day labor work, wherever possible.

The reason for this policy is obvious. The state highway organization is capable of doing twice the volume of work by contract that it could do under day labor because of the enormous detail imposed by the latter method of operating. Therefore, the Commission never undertakes by day labor a job large enough to warrant advertising for contract, except under exceptional circumstances or where a fair bid is not obtained.

During the early period of highway construction fully 80 per cent of all work was done by contract. As war conditions developed, the uncertainty in contracting influenced contractors to play safe, and bids were found to be excessively high. The result was that the percentage of day labor work automatically increased until recently the percentage volume of contract to day labor work reached about a 50-50 basis. With resumption of active construction under the more normal conditions that seem to be returning, the Commission hopes to do less and less day labor work, and more and more contract work.

In this connection attention might be called to the fact that the ability of the Commission to undertake its own work has had a very noticeable influence in keeping bids within reasonable and fair limits.

Elimination of Grade Crossings.

The policy of the Commission has been to eliminate wherever possible grade crossings with railroads. The Commission is constantly substituting for the grade crossings that yet exist either overhead or undergrade crossings.

How large a factor in the safety of travel this can be made is shown between Redding and the north boundary of the state where some forty grade crossings have been eliminated. When the plans of the Commission fully mature there will not be a main line railroad grade crossing on the state highway between the south line of Tehama County and the Oregon line, a distance of about 196 miles.

These overhead crossings and subways have been installed at the joint cost of the state and counties and the railroad companies with but one exception.

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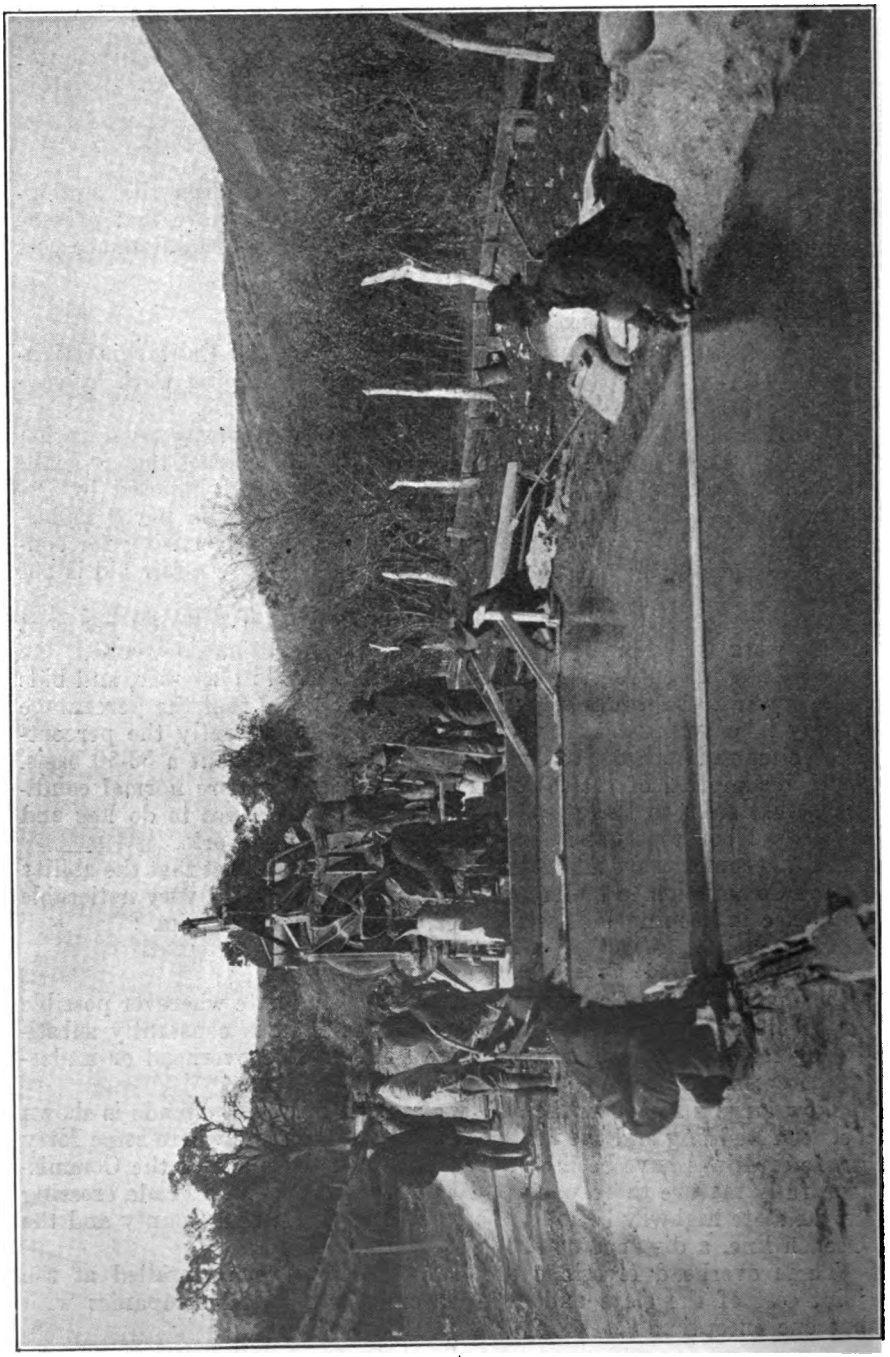


Plate VII. State Highway, Kern County, near Tejon Pass, Showing Method of Constructing Half Width of Concrete Base to Allow Passage of Traffic.

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Beautification of Highway System.

The beautification of highways in the opinion of the Highway Commission should be given increased attention. There is a widespread desire among communities to assume the burden of tree planting along the highways in their vicinity. The Commission believes that this should be actively encouraged not only for the added pleasure that it will afford travel, but also because of the protection that shade affords the highway, resulting in reduced costs of maintenance. Accordingly at the instance of the Highway Commission a working agreement has been perfected between the State Board of Forestry, the Department of Landscape Gardening of the University of California and the California Highway Commission, whereby a plan for highway beautification will be prepared covering the entire state highway system. It is believed this plan will prevent unscientific planting on a hit or miss basis, and that its execution will add immeasurably to the beauty of the state highways. Communities desiring to plant the highways in their vicinity will be given a scientifically prepared plan for that particular section, and will be permitted and encouraged to proceed under that plan.

In order to further encourage this work, the Highway Commission has purchased a tract of thirty acres near Davis upon which trees and shrubs for highway planting will be grown. The expense of administration, operation and improvement of the nursery will be borne by the State Forestry Board.

Preservation of the Redwoods.

Equally important with the beautification of the highways by tree planting is the preservation of the natural growth of trees and shrubs now growing on the right of way. The preservation of the redwoods along the state highway in Mendocino, Humboldt and Del Norte counties is a matter of vital concern to the whole state. We feel that we would be derelict in our duty if we did not urge the importance of action to preserve for future generations the more scenic and magnificent groups of redwoods growing along the state highway.

Highway Budget to be Followed.

That both the $20,000,000 set aside in the $40,000,000 bond issue for uncompleted roads in the first two bond issues as well as the $20,000,000 voted for new roads will be spent in accordance with the budget on which the bond issue was based is the publicly announced policy of the Highway Commission.

Adherence to the budget is necessary in the opinion of the Commission by reason of the increased cost of highway construction which will prevent the money voted doing all the work that was mapped out for it to do. By adherence to the budget plan, each community will be protected in the funds originally intended for its roads.

Convict Work on State Highways.

Two more years of experience with convict labor in building highways has emphasized the value of this work both to the state and to the convicts employed on the work. Excellent roads have been constructed by the convicts at a reasonable cost.

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How successfully the plan has worked out for the convicts was testified to by James A. Johnston, Warden of San Quentin Penitentiary, in an address delivered before the Commonwealth Club in September, 1920. Here are some of the things that Warden Johnston said:

> For the five years and more that we have been building roads on the honor plan, with more than one thousand men at that work, the net loss by escape has been just thirteen men.
>
> I believe and, out of abundance of experience, I know that trustworthiness grows with trust; that the men who have been tried at that sort of labor have performed a useful service for the state while expiating the crimes for which they were sentenced, and that in larger percentage than any other group of men who have been convicted of crime they have made good following release.
>
> Although we have not had a long enough experience with them after final release to be able to speak authoritatively as to figures, we have had opportunity to compare the result of paroling men from that sort of work with that of paroling men directly from the prison, and it is greatly to the advantage of the men who have had that sort of work; because the reactions following release have not been as violent as experienced by those coming directly from prison.

The Commission plans the extension of this work, and at least three additional convict camps will be established during 1921 on the more remote mountain laterals where it is difficult to secure contracts and where the local labor supply is limited. The Commission desires to express its appreciation of the cooperation extended to it by the State Board of Prison Directors and by Wardens Johnston and Smith in their care in selecting and allotting convicts for this work.

Surplus War Equipment.

During the past two years the California Highway Commission has received surplus war material from the United States Department of War of the estimated value of $2,250,000. The Commission in turn has taken pleasure in the opportunity afforded it of assisting counties in their highway work by assigning trucks to them out of the allotment given California. There is still much war material and equipment in the custody of the government that has not yet been classified by the War Department as surplus material, and which accordingly is not available for distribution. Much of this equipment could be used with great advantage by the roadbuilding organizations of the states. If the decision as to whether or not this equipment can be properly classified as "surplus material" could be hastened, it would mean the early acquisition by the state of additional material of great value.

Time Required to Build Roads.

The Commission would call attention to the fact that it will probably be four years before the roads authorized under the $40,000,000 bond issue can all be constructed. An extensive building program has been outlined for 1921, and the work will be so advertised as to give contractors advantage of the best building season in the particular localities in which the roads are to be built.

The tendency in every community where there is uncompleted highway is to expect immediate construction for its particular road. The policy of the Commission is to distribute the work over the whole state to the end that each of the seven divisions of the state highway organi-

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zation shall be kept busily employed, and to the further end that highway work may assist in relieving unemployment conditions in every part of the state. The Highway Commission will diligently pursue the task of completing the system, but it would be impractical and unwise to attempt a building program beyond the ability of the organization to properly plan and supervise.

The fact should not be forgotten that surveying and the preparation of plans and specifications are as much a part of construction as actual building. This engineering work is in progress on all uncompleted sections of the system, whether belonging to the so-called new or old roads. It is intended that there shall be no delay in construction by reason of lack of engineering preparation when the time comes that these roads can be actually built.

New Amendment Removes Handicap.

The Highway Commission believes that one of the greatest forward steps that has been taken in state highway affairs during the past two years has been the substitution of a flexible interest rate for the fixed and inflexible rate that during the greater part of the past two years made impossible any hope of marketing these bonds by direct sales. The new plan should assure the Highway Commission of money when money is needed, and should enable an intelligently planned program of highway construction to be carried on without interruption because of lack of funds.

Should State Make Its Own Cement?

One of the great problems before California now is the cost of cement. While there has been a great decrease in the price of cement in the East and Middle West, there has been no reduction in California. The Commission is investigating the cost of constructing cement plants to determine the feasibility of building such plants as a means of supplying cement both for road construction by the state and by counties and cities and for public building generally.

Importance of Federal Aid Money.

The importance to California of federal aid in highway construction is such that we believe that California's representatives in Congress should be requested by the Legislature to give active assistance to secure a continuance of liberal appropriations for this work.

The California Highway Commission has been made the agent of the federal government for the expenditure of federal road funds in this state. All projects recommended by the Commission as federal aid projects are, of course, subject to final approval by the Bureau of Public Roads of the United States Department of Agriculture. In expending these government funds the Commission has rigidly adhered to the policy of using the money thus received for the completion of the state highway system, and of refusing to recommend the improvement of local roads, not within the state highway system, as proper projects for federal aid. It is the very pronounced opinion of the Commission that until the state highway system is completed, all federal moneys should be devoted to its construction.

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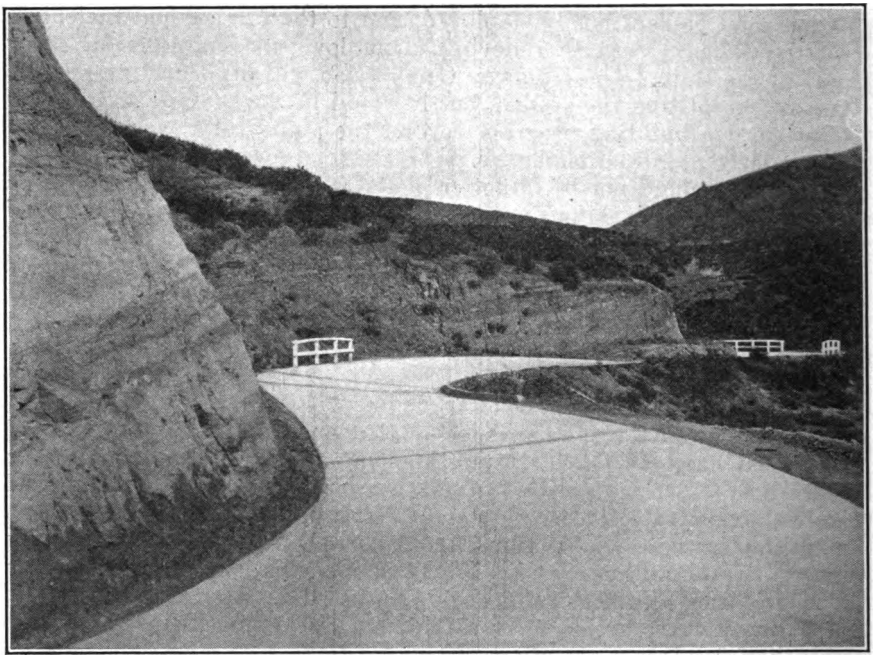


Plate VIII. State Highway, Los Angeles County, Showing Superelevation on the Ridge Route.



Plate IX. State Highway, Ventura County, Conejo Grade. Completed Concrete Base.

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Study of State Highway System.

In view of the investment that the federal government has made in California roads, and at the invitation and the request of the California Highway Commission, the Bureau of Public Roads of the United States Department of Agriculture has conducted a study of the California highway system. This study has been both intensive and extensive and the report undoubtedly will be of great value.

Details of Work in Other Reports.

For more detailed information regarding the activities of the Commission, readers are referred to the articles that accompany this statement, and which constitute a part of the biennial report of the Commission.

Thanks Due to Governor Stephens.

The Commission desires to express its great appreciation of the personal interest that Governor William D. Stephens has shown in its work and of his great helpfulness to the Highway Commission and to the cause of good roads in California. Owing to the financial straits into which a failing bond market plunged highway work, the last eighteen months have been particularly anxious and trying months in highway administration. It is with satisfaction that the Commission reports that despite the dire financial necessity in which it continually found itself, work of major importance was carried on. The program originally mapped out suffered a drastic reduction because of labor and cost conditions and failure to sell bonds. A similar condition prevailed all over the United States. But despite these conditions through the assistance of counties, and the loyal support of material and supply men and contractors, work of immediate and urgent necessity was carried on to completion.

Although at times it seemed almost inevitable that going contracts be shut down with resulting damage suits running into hundreds of thousands of dollars, the Commission managed to keep every contract going until financial relief came.

Cooperation is Appreciated.

The Commission desires also to express its appreciation for the cooperation and assistance given by other state departments to the Commission in its work.

The Commission would further express to its Chief Engineer, Mr. A. B. Fletcher, and to his assistants the state over, to the Acting Secretary and Attorney, Mr. C. C. Carleton, and the employees of his department, its appreciation of the very able, loyal and public spirited service that they have given to the state.

The Value of our Highways.

The value of the highways of California cannot be measured in dollars alone. They have a human worth far beyond their commercial value. Over these highways the whole people of California are traveling. Visitors from every part of the world are viewing California over its good roads. And as its people come to know California, its wonder

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Plate X. State Highway, Marin County, Heavy Grading Work, near San Rafael.

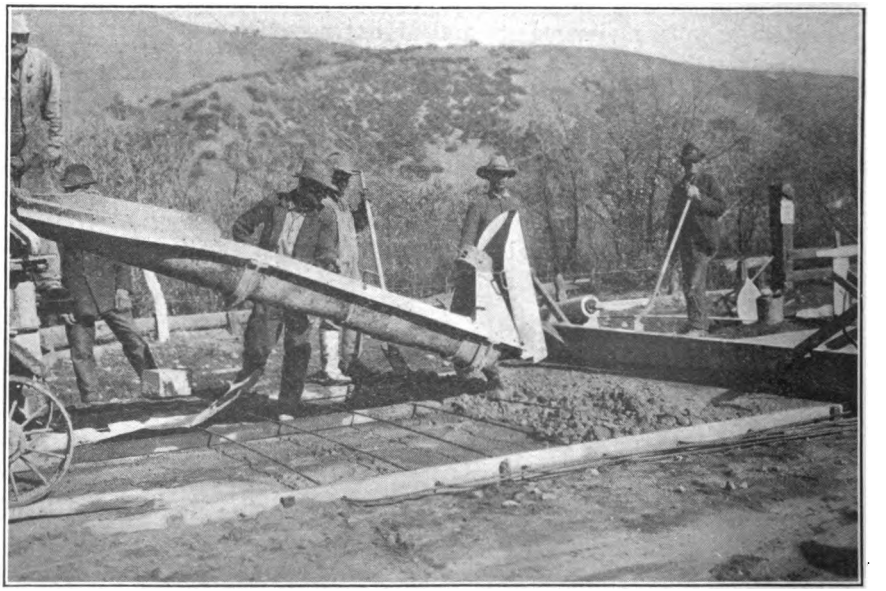


Plate XI. State Highway, Kern County, Construction near Tejon Pass, Showing Reinforcement and Constructing Half-Width of Concrete Base to Allow Passage of Traffic.

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places and its spectacular spaces, a new and greater love of state and country is arising. Better roads are building not only a better state but a better people as well. It is the firm opinion of the California Highway Commission that not only is California's investment in good roads paying an immense dividend in money, but it is paying an even greater dividend in the added happiness and the added well being of the state's great human family.

CALIFORNIA HIGHWAY COMMISSION.

N. D. DARLINGTON,
CHAS. A. WHITMORE,
GEORGE C. MANSFIELD,
Members.

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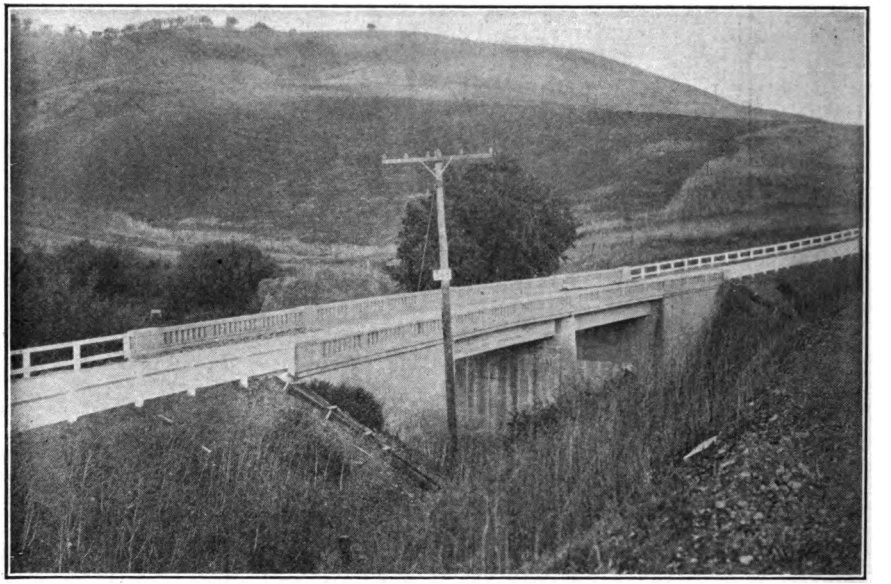


Plate XII. Bridge on State Highway, Santa Barbara County, over Cañada del Refugio.

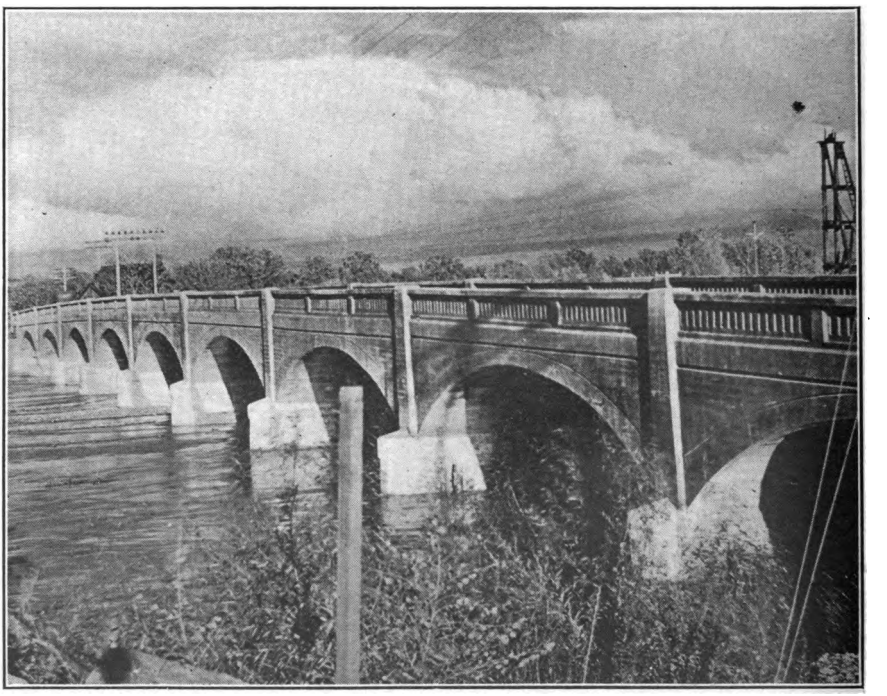


Plate XIII. Bridge on State Highway, Shasta County, over Cottonwood Creek.

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APPENDIX A.

REPORT OF HIGHWAY ENGINEER TO CALIFORNIA HIGHWAY COMMISSION.

December 31, 1920.

To the CALIFORNIA HIGHWAY COMMISSION,
Sacramento, California.

Introductory.

GENTLEMEN: As in the last biennial report, a series of appendices has been prepared for inclusion in this report, compiled chiefly by the several department heads at the Headquarters office, which cover rather completely the varied activities of the Commission's work since June 30, 1918.

Unless otherwise explained, the statistics in all of the appendices relate only to the biennial period ended June 30, 1920.

The outstanding event in state highway activities during the biennial period in 1919-1920 was the adoption by the people of the State of California at a special election held July 1, 1919, of a constitutional amendment providing for the issuance of state highway bonds to the amount of $40,000,000 to complete the projects contemplated by the two previous state highway bond issues in amounts $18,000,000 and $15,000,000, respectively, and to construct thirty-one new projects specified in the constitutional amendment.

This amendment was endorsed by a vote in the proportion of about seven for to one against the proposition.

Notwithstanding this spontaneity of demand for the continuation of state highway construction in California, it became apparent in a few months that the low rate of interest of 4½ per cent, as unalterably fixed in the constitutional amendment, made the sale of the $40,000,000 state highway bond issue in the general market impossible and the state authorities found themselves confronted by an unfavorable bond market similar to the situation which had existed in the case of the first state highway bond issue of $18,000,000, carrying a fixed interest rate of 4 per cent.

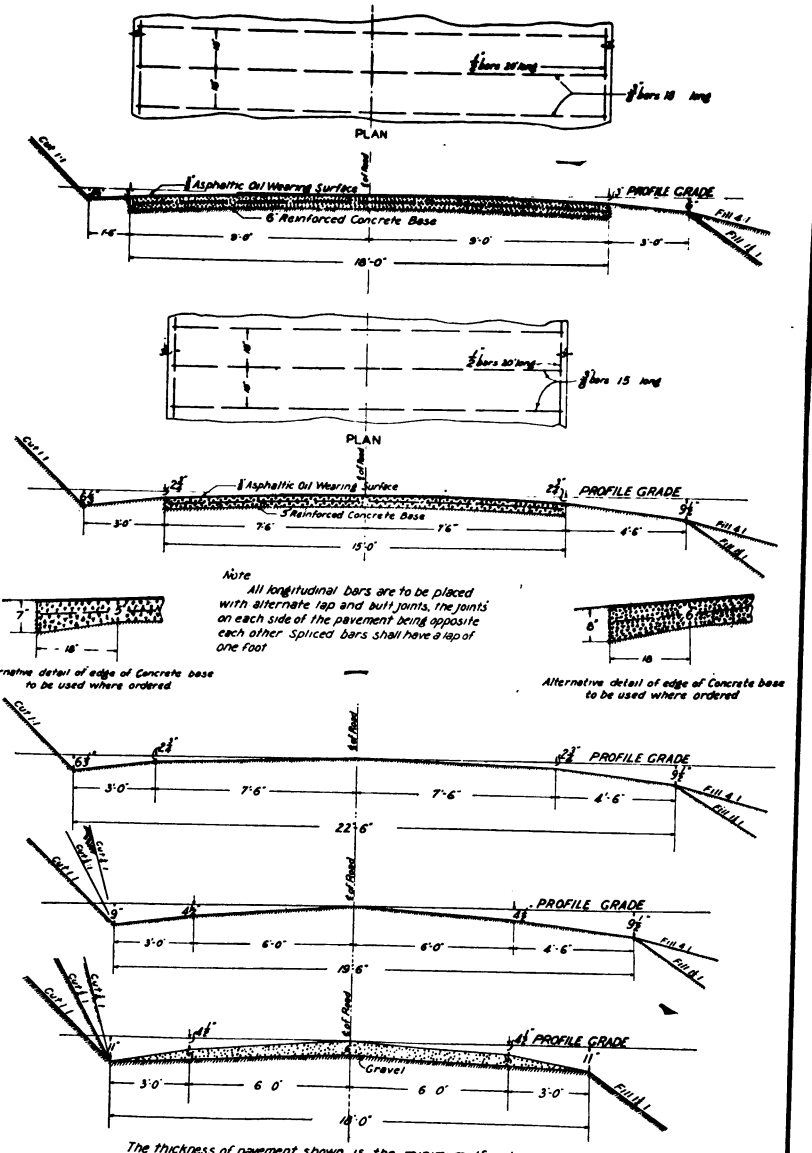
In November, 1919, a block of the second issue, in amount $3,000,000, was sold by the State Treasurer at par and accrued interest, but owing to the unfortunate blunder of a newspaper in printing the advertisement of sale, the sale was invalidated.

Before another sale could be consummated the bond market became depressed to such an extent that the new issue could not be sold at par and accrued interest as provided by the provisions of the constitutional amendment.

In February, 1920, a block of the new issue, in amount $3,000,000, was sold through the employment of Federal Aid road funds to the amount of $222,160.50 to bonus the sale.

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TYPICAL SECTIONS



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Litigation ensued to test the legality of such procedure, which has not yet been finally determined by the courts.

Finally, in order to effect the sale of more of the bonds to at least provide for a limited program of work, recourse was had to the counties, which are empowered by law to invest their surplus county moneys in such securities.

Bonds to the amount of $3,122,000 were so purchased by the counties up to December 17, 1920.

In the recent general election of November, 1920, a constitutional amendment has been adopted by the people of the State of California permitting a flexibility of the interest rate in the bonds, such rate at no time, however, to exceed 6 per cent per annum.

This will enable the appropriate state authorities to fix a rate of interest in the blocks of bonds as they are placed on the market from time to time which will accord with the current market interest rates and thereby make such blocks of bonds readily salable.

It is expected that this later amendment will facilitate the sale of the state highway securities so that the state highway work can proceed in an intelligent, continuous and systematic manner, and in such measure as the California Highway Commission, after consideration of prevalent costs of labor and material, may deem prudent.

During the year 1919 and prior to the slump in the bond market in the autumn of that year, state highway bonds issued under the "State Highways Act of 1915" ($15,000,000 issue) were sold in the general market to the amount of $4,884,000.

These bond sales, supplemented by certain moneys received from the United States government in reimbursement to the state on Federal Aid projects, a portion of the state's share of motor vehicle license receipts and contributions from counties to finance the construction of certain county bridges, have enabled the Commission to carry on considerable state highway construction during the years 1919-1920, but, obviously, on account of the irregularity and uncertainty of the bond situation, the Commission could not formulate and carry out a definite and consistent program of work as otherwise it might have done.

On June 30, 1920, the total expenditures from the State Highway Fund amounted to $34,998,796.51, and of this amount $9,434,587.30 was paid out after June 30, 1918. [1]

Likewise the total expenditures from the Motor Vehicle Fund amounted to $5,780,550.92, of which $2,872,873.14 was disbursed between the dates of June 30, 1918, and June 30, 1920.[1]

[1] For detailed account of this disbursement see Appendix "I".

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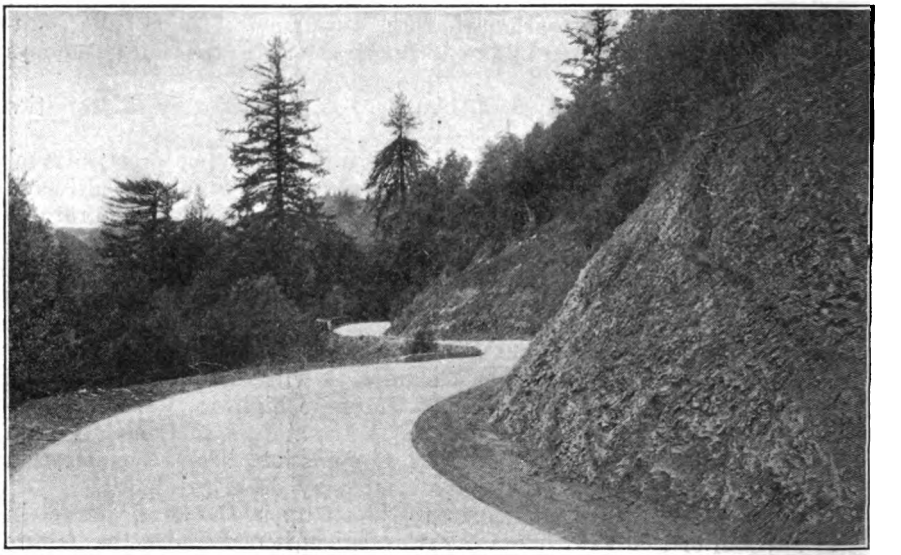


Plate XIV. State Highway, Santa Cruz County, near Glenwood.

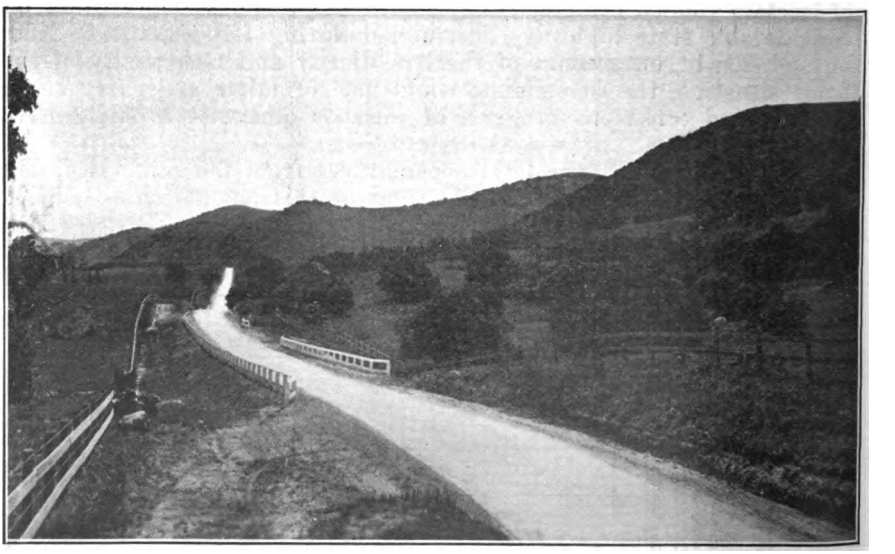


Plate XV. State Highway, San Benito County, near San Juan Bautista.

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Mileage and Types of Work.

The following table shows the mileage of the several types of work in the state highway system to June 30, 1918, and also to June 30, 1920, completed sections only being included:

Mileage of State Highways Completed to June 30, 1920.

	June 30, 1916 Miles	1916-1918 Miles	1918-1920 Miles	June 30, 1920 Total Miles
Cement concrete base with Topeka mixture or sheet asphalt tops	32.90	11.68	31.35	75.93
Cement concrete base with thin bituminous top	720.36	223.51	336.63	1,280.50[1]
Broken stone base with Topeka mixture top	16.18			16.18
Oiled macadam	149.61	22.00	34.49	206.10[2]
Bituminous concrete	10.66	4.88	0.91	16.45[2]
Graded, but not paved	196.14	67.84	146.93	412.91[3]
Totals	1,127.85	329.91	550.31	2,008.07[3]

[1]Includes 31.37 miles built by the counties, but now under the jurisdiction of the Commission. On approximately 745 miles of this type, the thin bituminous top has not been applied.

[2]Includes 186.95 miles built by local authorities, but now under the jurisdiction of the Commission.

[3]This figure does not include 750 miles of graded road taken over from the State Engineer's jurisdiction, and by subsequent appropriations.

The foregoing figures do not include unaccepted contracts incomplete on June 30, 1920, at which time the following mileages of road were under contract let and in progress:

State Highways Under Construction June 30, 1920.

Cement concrete base with Topeka mixture tops	7.19 miles
Cement concrete base with thin bituminous tops	184.13 miles
Graded but not paved	294.06 miles
Total	485.38 miles

Of the foregoing uncompleted contracts not less than 47 per cent of the work had been finished on June 30, 1920.

The following table shows the total quantities of grading and concrete dealt with since the beginning of the work:

	1912-1916 (inclusive)	1917-1918	1919-1920[1]	Totals
Grading, cubic yard	6,750,000	2,339,000	1,653,000	10,742,000
Concrete, cubic yard	882,300	252,900	188,200	1,323,400

[1]Quantities to December 31, 1920.

Work to be Done.

As nearly as can be ascertained, in the absence of many miles of surveys not yet made, the state highway system (bond issue roads only) includes a total of about 5560 miles. As already shown, work has been done by the combined efforts of the state and the counties on 2493 miles of the system, leaving on June 30, 1920, about 3067 miles to be improved. These roads or sections of routes are shown below. The sections may be identified on the map accompanying this report marked "Appendix S."

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Portions of System Upon Which No Work Has Been Done July 1, 1920.

County	Route	Section	Termini	Miles
Sonoma	1	A	Healdsburg to Cloverdale	16.2
Mendocino	1	B	Hopland to 2½ miles north	2.6
Humboldt	1	G	Fortuna to Loleta	3.9
Humboldt	1	I	Arcata to Trinidad	15.6
Humboldt	1	J	Trinidad to Freshwater Lagoon	24.7
Humboldt	1	K	Orick to Del Norte County line	18.7
Del Norte	1	A	Humboldt County line to Wilson Creek	13.5
Del Norte	1	B	Wilson Creek to Last Chance	3.1
Del Norte	1	C-D-E	Crescent City to Oregon line	43.0
Tehama	3	D	Los Molinos to Red Bluff	1.0
Shasta	3	A	Southerly boundary to Redding	15.5
Siskiyou	3	B	Gazelle to Yreka	17.6
Sacramento	4	A	Galt to southerly boundary	1.9
Kern	4	D	1 mile north of Bakersfield to Bakersfield	1.0
Alameda	5	B	Castro Valley road to Hayward	0.5
Alameda	5	C	At Overacker's Corner	0.3
Yolo	6	C	Sacramento River to end of paving West Sacto.	0.6
Los Angeles	9	B	La Canada to Pasadena	3.5[2]
Monterey	10	A-B-C	San Lucas to easterly boundary	27.0
Fresno	10	A-B-C	Monterey County line to Coalinga	23.7
Fresno	10	E-F	Oil King school house to Kings County line	20.1
Kings	10	B	Fresno County line to 1 mile north of Lemoore	12.4
Kings	10	C	1 mile north of Lemoore to Hanford	9.4
Tulare	10	C-D-E	Visalia to Three Rivers	29.3[1]
Tulare	10	F	Three Rivers to Sequoia National Park	5.9
El Dorado	11	D-E	Placerville to Sportsman Hall	10.0
San Diego-Imperial	12	H	Along San Diego-Imperial County boundary	1.8
Imperial	12	A	Westerly boundary to Myers Creek	5.1
Mendocino	15	A	Route 1, near Ukiah to Lake County line	13.1
Lake	15	A-B-C	Mendocino County line to Colusa County line	41.6
Colusa	15	B-C-D-E	Lake County line to Williams	34.7
Sutter	15	A-B	Meridian to Yuba City	16.0
Yuba	15	A-B	Marysville to easterly boundary	
Nevada	15		Yuba County line to Placer County line	81.6
Placer	15		Nevada County line to Route 37, near Cisco	
Placer	17	C	Auburn to Nevada County line	6.7
Mariposa	18	D-E-F-G	Mariposa to El Portal	30.1
Shasta	20	A	Trinity County line to Tower House	8.5
Trinity	20	A-B	Weaverville to Shasta County line	24.2
Trinity	20	C-D	Westerly boundary to Whites Bar Creek	29.0[2]
Trinity	20	F	Helena to Douglas City	21.0
Humboldt	20	A-B	Arcata to Redwood Creek	25.0
Humboldt	20	D	Three Creeks to Trinity County line	12.0
Butte	21	B-C	Oroville to Plumas County line	39.0
Plumas	21	A-B-C	Butte County line to Quincy	48.0
Santa Clara	22	A	Junction Route 32 at San Felipe to San Benito County line	0.6
San Benito	22	B	Santa Clara County line to Hollister	8.0
Los Angeles	23	F-G	Palmdale to northerly boundary	16.0
Kern	23	A-B-C-D E-F-G-	Los Angeles County line to Inyo County line	74.5
Inyo	23	G-H-I-J K-L-M	Kern County line to Independence	74.0
Inyo	23	C-D-E	Fish Spring school to Round Valley road	30.4
Mono	23	D-E	Magee Creek to Deadman Creek	16.9
Mono	23	H-I	Tioga Pass Junction to Bridgeport	26.3
San Joaquin	24	B	Lodi to Clements	12.3[1]
San Joaquin	24	A	Clements to easterly boundary	4.3
San Bernardino	26	A-B	San Bernardino to southerly boundary	12.1[1]
Riverside	26	B	Beaumont to Banning	3.0[1]
Riverside	26	C-D-E	Banning to Indio	41.3
Imperial	26	D	Gravel Wash to Tule Wash	6.6
Imperial	26	A-F-G-H	Trifolium Canal to El Centro	26.3
Imperial	27	C-D-A	El Centro to County Well	35.9
Imperial	27	B	Through Yuma Indian Reservation	8.2
Shasta	28	ABCDE	Redding to Lassen County line	85.0

[1]Improved county road.
[2]12 miles built by U. S. Forest Service on Section C.

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Portions of System Upon Which No Work Has Been Done July 1, 1920—Cont'd

County	Route	Section	Termini	Miles
Lassen	28	A-B	Pitville to Adin	30.0
Modoc	28	A	Adin to Adin Summit	13.0
Tehama	29	A-B-C	Red Bluff to Plumas County line	52.5
Plumas	29	A	Tehama County line to Lassen County line	23.0
Lassen	29	A	Westerly Boundary to Coppervale	10.0
Lassen	29	C-D-E	Susanville to Nevada State line	53.0
San Bernardino	31	C-D-E-F	Summit to Barstow	52.2
Santa Clara	32	A-B-C	Gilroy to Merced County line	26.2
Merced	32	A-B-C	Santa Clara County line to Madera County line	41.7
Madera	32	A	Merced County line to Route 4, near Califa	15.7
San Luis Obispo	33	A-B	Paso Robles to 1 mile northeast Shandon Pumping station	24.1
Kern	33	A-B	San Luis Obispo County line to Hart Station	31.8
Kern	33	C	Hart Station to Wasco	19.0[1]
Kern	33	D	Wasco to Famosa	7.5
Sacramento	34	B	Route 4 near Arnold to Clay	9.3[3]
Sacramento	34	A	Clay to Amador County line	8.5
Amador	34	A-B	Sacramento County line to Jackson	16.6
Placer	37	ABCDE FGH	Auburn to Summit	53.2
Nevada	37	ABCDE	Placer County line to Sierra County line	31.6
Sierra	37	A	Nevada County line to Nevada state line	12.5
Placer	38	B-C	Tahoe City to Nevada County line	14.0
Nevada	38	A	Placer County line to Route 37 at Truckee	0.8
Fresno	41	A-B	General Grant National Park to Kings River Canyon	14.5
Fresno	41	C	Lockwood Creek to Boulder Creek	6.0
San Bernardino	43		Deep Creek to Metcalf Creek	14.0
Del Norte	46	A	Route 1 near mouth of Klamath River to Humboldt County line	9.0
Humboldt	46		Del Norte County line to Siskiyou County line	53.0
Siskiyou	46	A-B-C-D	Humboldt County line to Klamath River bridge, Route 3	115.0[4]
Glenn	47	A	Orland to Butte County line	10.3
Butte	47	A	Glenn County line to Chico	8.5
Mendocino	48	A-B-C	McDonald to mouth of Navarro River	51.0
Lake	49	A	Napa County line to Lower Lake	21.6
Napa	49	A	Calistoga to Lake County line	14.0
Yolo	50	A	Rumsey to Lake County line	10.0
Lake	50	A	Yolo County line to Lower Lake	15.0
Sonoma	51		Santa Rosa to Shellville	24.0
Marin	52	A	Tiburon to Alto	5.5
Solano	53	A-B	Rio Vista to Fairfield	20.8
Amador	54	A	County line near Michigan Bar to Drytown	10.7
San Francisco	55	A	Intersection of Great Highway and Sloat Boulevard to San Mateo County line	2.1
San Mateo	55	A-B-C-D	San Francisco County line to Santa Clara County line	37.5
San Mateo, Santa Clara	55	E	San Mateo County line to San Mateo, Santa Clara, and Santa Cruz County common corner	5.0
Santa Clara, Santa Cruz	55	A-B	San Mateo, Santa Clara, Santa Cruz County common corner to Route 5, near Glenwood	19.5
Monterey	56	ABCDE FGH	Carmel to Monterey County line	81.4[4]
San Luis Obispo	56	A	Monterey County line to San Simeon	16.2
Santa Barbara, S. Luis Obispo	57	A-B-C	Along San Luis Obispo-Santa Barbara County boundary	38.2 / 33.7
Kern	57	A	Westerly boundary to Maricopa	12.0
Kern	57	B-C-D	Maricopa to Bakersfield	35.3[1]
Kern	57	EFGHI JKL	Bakersfield to Freeman (via Walkers Pass)	81.9
Kern	58	A-B-C	Mojave to San Bernardino County line	34.7
San Bernardino	58		Kern County line to Needles (via Barstow)	201.0
Los Angeles	59		Lancaster to Baileys	34.0

[1]Improved county road.
[3]Partially improved county road.
[4]U. S. Forest Service building 50 miles, Section A.

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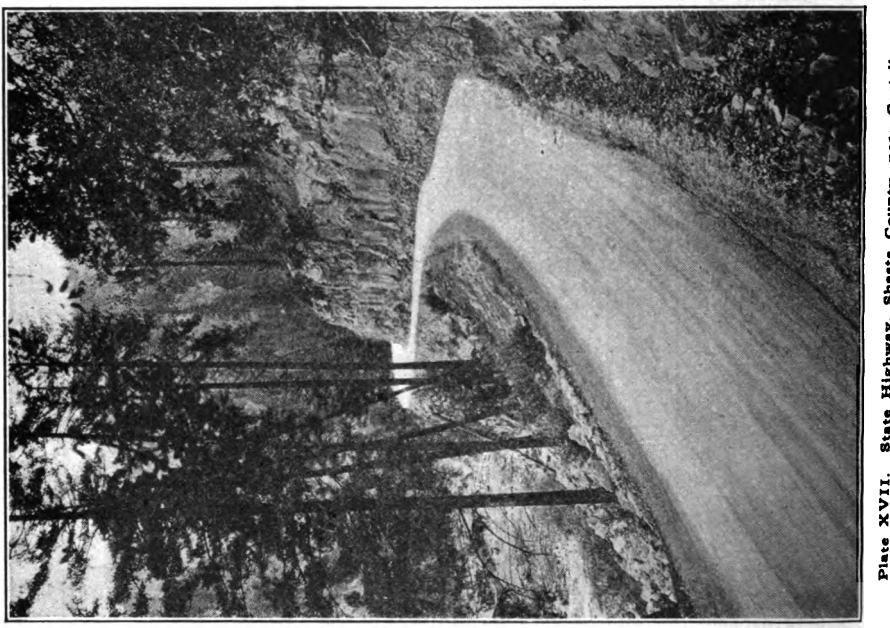


Plate XVII. State Highway, Shasta County, near Castella.



Plate XVI. State Highway, Siskiyou County, near Dunsmuir.

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Portions of System Upon Which No Work Has Been Done July 1, 1920—Cont'd.

County	Route	Section	Termini	Miles
Ventura	60	A	Oxnard to Los Angeles County line	20.3
Los Angeles	60	ABCDE	Ventura County line to Orange County line	39.6[5]
Orange	60	A-B-C	Los Angeles County line to San Juan Capistrano	26.5[6]
Los Angeles	61		La Canada to Mt. Wilson road (via Arroyo Seco)	25.0
Los Angeles	62		Azusa to Pine Flats in San Gabriel Canyon	28.0
Inyo	63	A-B-C	Big Pine to Mono County line	88.6
Mono	63	A	Inyo County line to Oasis	2.0
Riverside	64		Mecca to Blythe	100.0
			Total	3,101.7

[5]36.7 miles in incorporated cities.
[6] 6.9 miles in incorporated cities.

Gaps Provided for Since June 30, 1920, Up to December 31, 1920.

County	Route	Section	Termini	Miles
Humboldt	1	I	Northeast ¼ section 19, township 7 north, range 1 east, Humboldt base and meridian to Strawberry Creek	1.0
Kern	4	D	Bakersfield to Beardsley Lane	1.0
Kings	10	B	Westerly boundary to 1 mile north of Lemoore	12.4
Sutter	15	B	Wadsworth Canal to Yuba City	6.0
Imperial	26	D	Gravel Wash to Tule Wash	6.6
			Total	27.0

The Increasing Costs of the State Highways.

To indicate in some measure how the costs of the state highways have increased year by year, a study has been made of the two principal items of work which affect the cost, namely, the earthwork and the concrete.

The following table shows the average contract prices on these items from 1912, at the beginning of the work, to December 31, 1920:

Average Contract Prices, [4]1912 to December 31, 1920.

Grading[1] (per cu. yd.)	Concrete, including all materials, (per cu. yd.)	Sand, delivered, (per ton)	Broken stone and gravel, delivered, (per ton)	Cement, delivered, (per bbl.)	Concrete,[2] exclusive of materials, (per cu. yd.)
$0 62	$8 08	$0 68	$0 90	$1 88	$3 81

[1]Includes all classifications.
[2]This is the item upon which the contractors bid in most cases; the state supplies the materials.
[4]Weighted average.

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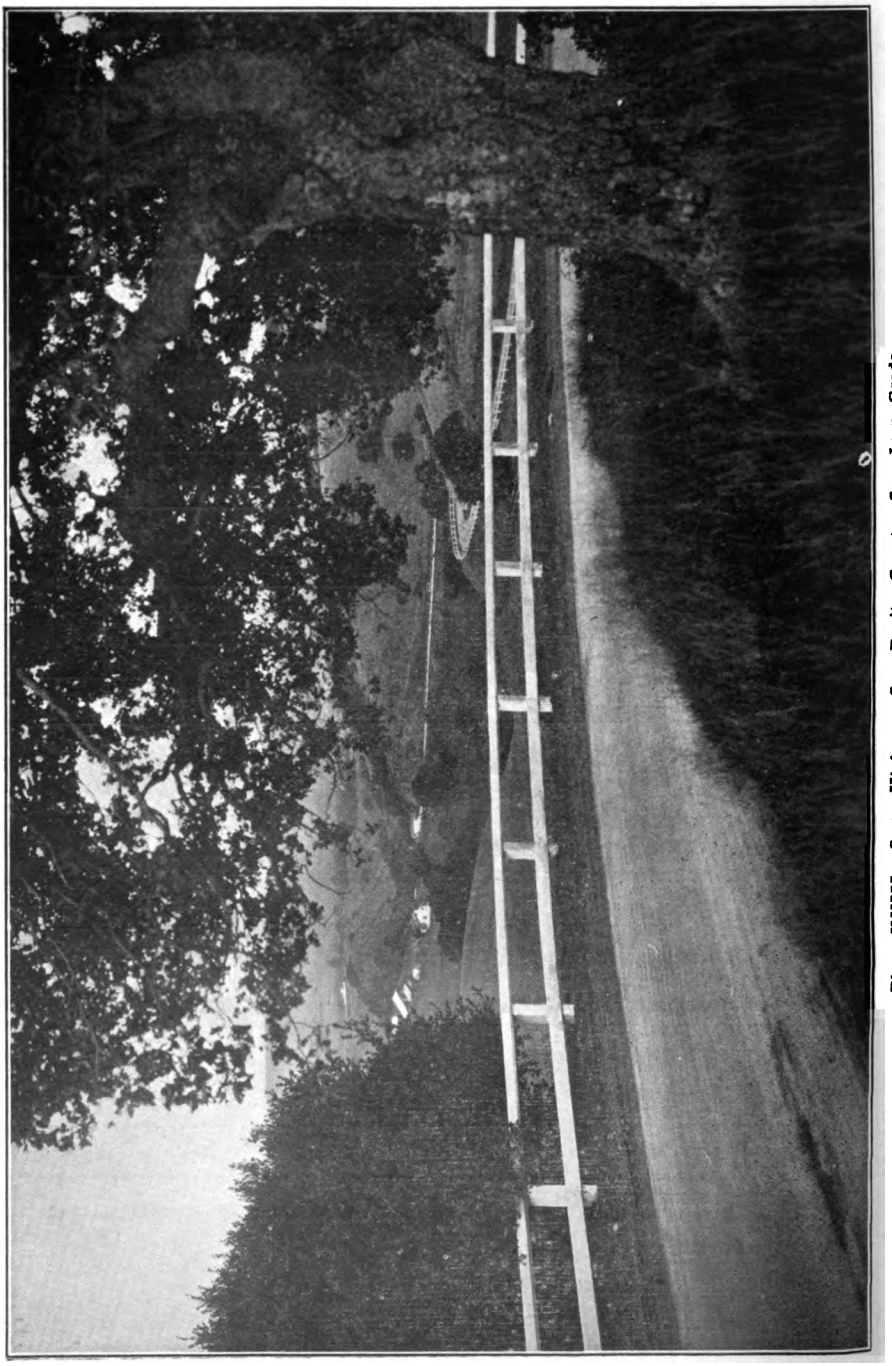


Plate XVIII. State Highway, San Benito County, San Juan Grade.

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Taking certain significant periods into consideration, namely, the pre-war years, the years of the war, and those since the armistice, brings out some interesting facts. The figures follow:

Average Contract Prices, [1]1912-1916 (Inclusive).

Year	Grading[1] (per cu. yd.)	Concrete, including all materials, (per cu. yd.)	Sand, delivered, (per ton)	Broken stone and gravel, delivered, (per ton)	Cement, delivered, (per bbl.)	Concrete,[2] exclusive of materials, (per cu. yd.)
1912	$0 39	$5 88	----------[3]	----------[3]	$1 61	----------[3]
1913	0 46	5 91	$0 56	$0 58	1 65	$2 56
1914	0 51	6 75	0 54	0 85	1 70	3 08
1915	0 45	6 26	0 58	0 76	1 74	2 84
1916	0 37	6 37	0 60	0 76	1 80	2 90
Average[4]	$0 49	$6 35	$0 56	$0 78	$1 70	$2 92

Average Contract Prices, [1]1917 and 1918.

Year	Grading[1] (per cu. yd.)	Concrete, including all materials, (per cu. yd.)	Sand, delivered, (per ton)	Broken stone and gravel, delivered, (per ton)	Cement, delivered, (per bbl.)	Concrete,[2] exclusive of materials, (per cu. yd.)
1917	$0 73	[5]$8 03	$0 66	$0 86	$1 80	$4 17
1918	0 78	[5]10 51	1 05	1 28	2 20	5 53
Average[4]	$0 74	$8 67	$0 76	$0 96	$1 90	$4 51

Average Contract Prices, [1]1919 and 1920 (to December 31, 1920).

Year	Grading[1] (per cu. yd.)	Concrete, including all materials, (per cu. yd.)	Sand, delivered, (per ton)	Broken stone and gravel, delivered, (per ton)	Cement, delivered, (per bbl.)	Concrete,[2] exclusive of materials, (per cu. yd.)
1919	$0 96	$13 08	$1 10	$1 33	$2 64	$6 37
1920	1 10	16 92	1 23	1 41	2 68	7 64
Average[4]	$1 01	$15 43	$1 17	$1 37	$2 66	$7 00

[1]Includes all classifications.
[2]This is the item upon which the contractors bid in most cases; the state supplies the materials.
[3]In 1912 the contractors in all cases except one furnished the concrete aggregates.
[4]Weighted average.
[5]In 1917 and 1918 the paving concrete was enriched from 1:2½:5 mixture to 1:2:4. In the prices stated allowance has been made for this change.

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These data show that during the war period the earthwork cost about 51 per cent and the concrete about 37 per cent more than during the pre-war period and that since the armistice the earthwork has cost 106 per cent and the concrete 143 per cent more than they averaged to cost before the war.

It is also worth while to note that before the war the cost of the cement delivered averaged $1.70 per barrel and that since the armistice the cost has advanced to $2.66 per barrel, or approximately 56 per cent; also, that the labor, hauling and manipulation cost of the concrete shows an advance during the same interval from $2.92 to $7 per cubic yard, or 240 per cent.

In Appendix "H" is a discussion of the rail transportation costs of construction materials where it is estimated that the total advance in freight costs on all shipments is at least 300 per cent above the pre-war charges.

It seems to be only necessary to call attention to the foregoing items of advanced cost to show how inadequate were the figures used in making the estimates at the time the legislation was drafted which led up to the $40,000,000 bond issue of 1919. These advanced costs alone make one pause to consider what will be the outcome of the so-called budget upon which the bond issue was based, to say nothing of the urgent necessity for widening and thickening the paving on both the state highways now in use and those to be built.

Happily the outlook for 1921 appears to be brighter. The bond market shows indications of improvement and labor is more plentiful, and with the promised lower costs of commodities in general, labor will doubtless be cheaper.

It is probable, however, that the state highways of the future may not be built at the low pre-war prices, at least for a long time to come.

Highway Costs and Administration Expense.

The table following shows the expenditures for state highway purposes from the beginning of the work to June 30, 1920.

The table also segregates these expenditures annually after the year 1914 into the following items: Highways, Equipment and Stores, Engineering and Inspection in Connection with Contracts, Preliminary Surveys, Administration Expense at Division Offices, and Administration Expense at Headquarters Office.

It is interesting to note that by June 30, 1920, of the total expenditure 87.4 per cent had been used for direct highway costs and equipment, while at the date December 31, 1914, only 80.75 per cent went for such purposes. Also, that there was a consistent increase in the percentage for these items up to the end of the year 1919. The falling off of about 0.17 per cent during the first half of the year 1920 is doubtless due to the fact that the construction work reduced greatly in volume in that period because the state highway bonds sold then with great difficulty and there was less construction money available.

The table also shows that the administration expense of the work (both headquarters and divisions) by June 30, 1920, had been reduced from 6.231 per cent to 4.785 per cent.

In like manner the preliminary survey percentage was reduced from 7.86 per cent to 3.947 per cent on June 30, 1920, and the engineering and inspection expense from 5.16 per cent to 3.864 per cent.

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TOTAL AMOUNTS EXPENDED BY THE CALIFORNIA HIGHWAY COMMISSION (*)
TO JUNE 30, 1920.

	To June 30, 1920		To December 31, 1919		To December 31, 1918		To December 31, 1917		To December 31, 1916		To December 31, 1915		To December 31, 1914.	
ITEM	AMOUNT	PER CENT	AMOUNT	PER CENT	AMOUNT	PER CENT	AMOUNT	PER CENT	AMOUNT	PER CENT	AMOUNT	PER CENT	AMOUNT	PER CENT
HIGHWAYS	34,825,170.64	83.975	31,060,962.49	84.586	25,018,639.89	84.391	19,285,566.79	83.395	16,653,187.46	84.238	12,756,615.31	83.746	5,496,091.50	78.436
Equipment, Plants & Stores	1,422,107.36	3.429	1,096,539.15	2.986	833,313.50	2.811	684,545.37	2.960	528,761.23	2.675	353,183.59	2.318	162,044.63	2.313
Total	36,247,278.00	87.404	32,157,501.64	87.572	25,852,153.39	87.202	19,970,112.16	86.355	17,181,968.69	86.913	13,109,798.90	86.064	5,658,136.13	80.749
Engineering and Inspection in connection with contracts	1,502,203.09	3.864	1,494,528.01	4.070	1,282,769.40	4.327	1,066,079.31	4.610	949,585.71	4.803	783,321.40	5.142	361,585.11	5.160
Preliminary Surveys	1,637,218.90	3.947	1,374,581.76	3.743	1,152,315.07	3.887	1,019,510.62	4.409	799,531.36	4.044	691,562.80	4.540	550,753.26	7.860
Administration Expense at Division Offices	1,271,681.65	3.067	1,062,191.72	2.893	837,969.51	2.826	650,727.21	2.814	502,982.33	2.544	391,186.74	2.568	238,124.18	3.684
Administration Expense at Headquarters Office	712,658.28	1.718	632,238.23	1.722	521,279.39	1.758	419,082.11	1.812	336,193.21	1.696	256,834.68	1.686	178,461.02	2.547
Total	5,223,761.92	12.596	4,563,539.72	12.428	3,794,333.37	12.798	3,155,399.25	13.645	2,587,292.61	13.807	2,122,875.62	13.936	1,348,923.54	19.251
GRAND TOTAL	41,471,039.92	100.000	36,721,041.36	100.000	29,646,486.76	100.000	23,125,511.41	100.000	19,769,261.30	100.000	15,232,674.52	100.000	7,007,059.67	100.000
FUNDS FROM WHICH EXPENDITURES WERE MADE:														
First State Highway Fund and Premiums	18,002,129.00		18,002,129.00		18,002,129.00		18,002,129.00		17,769,362.96		14,691,701.27		6,923,123.82	
Second State Highway Fund	13,753,743.66		13,018,094.31		7,540,965.82		2,136,933.91		- - - - -		- - - - -		- - - - -	
Third State Highway Fund	3,242,923.85		- - - - -		- - - - -		- - - - -		- - - - -		- - - - -		- - - - -	
Motor Vehicle Fund	5,780,560.92		5,020,778.52		3,504,252.32		2,801,135.50		1,728,642.35		888,830.35		83,935.85	
Federal Aid	89,571.76		89,571.76		89,571.76		33,173.03		- - - - -		- - - - -		- - - - -	
Contribution by Counties	632,120.73		620,467.77		540,467.86		452,149.97		271,256.00		2,143.00		- - - - -	
Total	41,471,039.92		36,721,041.36		29,646,486.76		23,125,511.41		19,769,261.30		15,232,674.52		7,007,059.67	

Exclusive of Legislative Appropriation for special surveys (Chapter 746, Statutes of 1917), and of salaries of members of California Highway Commission and the highway engineer.

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Thickness of Concrete Base.

Early in the report a table is given showing the several types of work in the state highway system. It is shown there that of 1595 miles of paved road, 1356 miles were constructed with a concrete base.

It is well to emphasize here that in the California work there is no such thing as a *concrete road* as the term is technically understood. The roads are not like nor have they ever been intended to be like the concrete roads of the East and the Middle West. There a heavy concrete slab often as thick as eight inches is laid as the ultimate road. The concrete is mixed very rich in cement and the concrete is intended to remain without surface of any sort, the concrete itself to serve as a wearing surface.

In the First Biennial Report[1] of the Commission are the following statements:

"CONCRETE BASES.

"The Commission has more than 1000 miles of concrete base road of which more than 600 miles have been covered with the thin bituminous tops or carpets.

"This type of pavement may be called the 'standard' of the Commission and is worthy of a detailed description.

"The concrete base is generally 15 feet in width and of a minimum thickness of 4 inches. Where necessary, the roadway has been often further widened by 3-foot macadam or gravel shoulders on each side of the pavement, making the hard surfaced roadway 21 feet in width.

"The thin bituminous wearing surface is about one-half an inch in thickness and is composed of heavy asphaltic road oil and screenings. Except under very heavy traffic conditions, this surfacing has proved satisfactory in protecting the concrete pavement from wear.

"THICKNESS OF CONCRETE BASE.

"Most of the concrete road bases have been built from four to four and one-half inches in thickness.

"It has always been the plan ultimately to cover the concrete with bituminous material but for the two years past little of such surfacing has been done. It was recognized early that the second bond issue would fall far short of completing the roads contemplated and the bituminous top was one item which could be omitted, temporarily at least.

"It must be admitted that a concrete base so thin as four inches would not be at all suitable in localities where the frost penetrates deeply into the ground and nowhere in California has concrete been laid under such conditions.

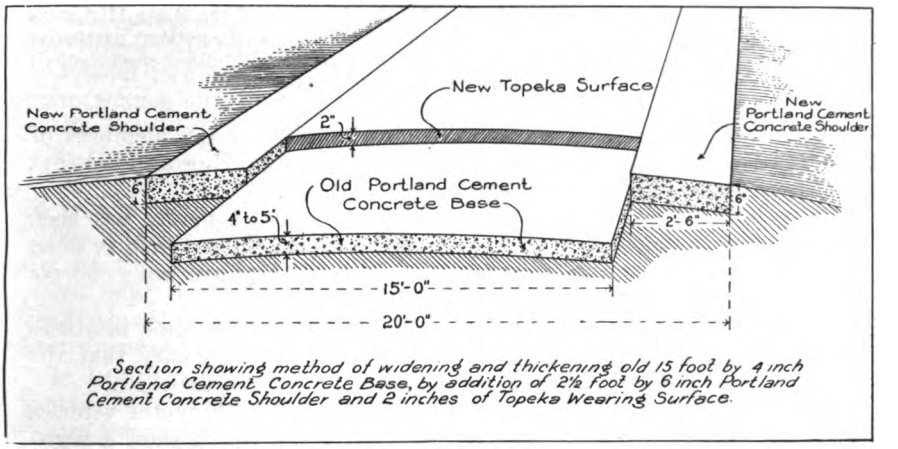
"It must also be admitted that experience has shown that over adobe subgrade it is not wise to lay so thin a base unless it is reinforced with steel. Even with such reinforcement longitudinal cracks develop which widen year by year despite frequent filling with asphalt, and a weakened pavement results. The reinforcement, without the use of more steel than seems justifiable, will not prevent the longitudinal cracks, but it appears to hold the concrete together and in some measure to lessen the progressive widening of the cracks. Increasing the thickness of the concrete per se does not remedy the longitudinal crack difficulty.

"The thin bases have given admirable service and have proved their economy under California conditions of climate and traffic whenever the underlying subgrade has been firm and hard and the concrete has remained in contact with the subgrade.

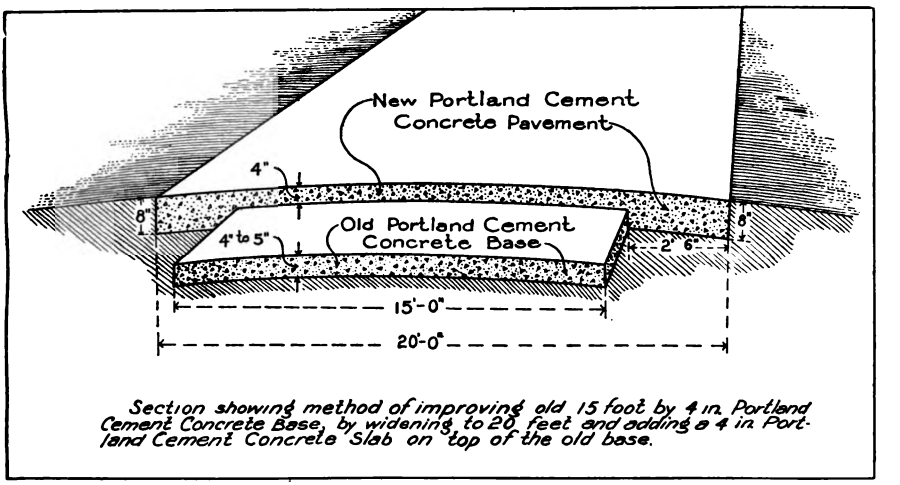
"It is true that in some localities the concrete has broken and disintegrated under the traffic, but such cases are so rare as to be almost negligible in considering the whole system."

[1] First Biennial Report California Highway Commission, December 31, 1918, accompanying Sixth Biennial Report of the State Department of Engineering.

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Section showing method of widening and thickening old 15 foot by 4 inch Portland Cement Concrete Base, by addition of 2½ foot by 6 inch Portland Cement Concrete Shoulder and 2 inches of Topeka Wearing Surface.



Section showing method of improving old 15 foot by 4 in. Portland Cement Concrete Base, by widening to 20 feet and adding a 4 in. Portland Cement Concrete Slab on top of the old base.

Also, to go back into ancient history, in the First Bulletin issued by the Commission in October, 1912, is the following statement:[1]

"The report of the committee to the League of California Municipalities raises some interesting points, but they touch upon no subject which has not been considered pro and con many times at the executive meetings of the Commission.

"I think that the plan adopted of constructing the bases of the roads of hydraulic cement concrete is above adverse criticism. A foundation is thus provided for almost any kind of wearing surface which the future may develop.

"The State Highways Act provides that the state shall maintain the roads and by the time the money is needed the Legislature will doubtless appropriate money for that purpose. When the time arrives that a better type of wearing surface seems desirable, it is likely that another bond issue will be voted. A permanent base will be ready to receive it.

"The pith of the criticism is that the Commission is trying to do too much work that the committee is pleased to call 'mediocre' in an endeavor to complete the state highway system within the sum appropriated, namely, $18,000,000.

[1] From a report by the Highway Engineer to the California Highway Commission on a criticism by the League of California Municipalities, dated August 12, 1912.

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"The reporters virtually recommend that the requirements of the State Highways Act be disregarded and that the Commission proceed with its work, without particular consideration of the entire mileage, and pave the main lines with either sheet asphalt on a heavy concrete base or with the so-called asphaltic concrete."

In the views expressed in the foregoing quotations the members of the Commission, past and present, and the Highway Engineer, always have been in accord.

Technically, the California state highways where concrete has been laid are and always have been intended to be *bases* upon which is to be placed bituminous or other wearing surfaces. They are not *concrete roads* and the specifications have never called them so.

It now happens, and beyond all expectations, that in some localities the traffic has so increased both in volume and in intensity that the thin bases are inadequate, both as to thickness and as to width.

While in 1913 there were probably fewer than 100,000 motor vehicles in the state, the records of the Motor Vehicle Department show a registration of more than 569,000 in 1920. This does not tell the whole story because during the same period, due to the failure of the railroads to meet the requirements of freight transportation and to other causes, the number of motor trucks has increased from a negligible number, so few in fact that no separate record was kept of them, to approximately 35,000.

It is a generally accepted theory that the highways must be designed more with regard to the intensity of traffic than to its volume. The roads must be widened and thickened. The ways of doing this seem to be obvious but the Commission has a problem to solve in finding the money for the work.

There appears to be no flaw in the Commission's plan of building the pavements on what might be called the unit plan but it must be admitted that the present high cost of all construction work makes the financing of the additions to the pavements a difficult problem.

In general, heretofore, a part of the asphalt surfacing (Topeka surface work) and the widening of the pavements has been paid for out of the Motor Vehicle Fund. Unless this fund is greatly increased by higher fees for the registration of the motor vehicles or by some other means, it will hardly be possible to continue to draw upon it for such uses. The fund is urgently needed for the maintenance work which was the primary purpose for which it was created.

It was hoped that the Federal Aid moneys, which under existing federal laws would add in total about $8,300,000 to the state bond moneys, would be available, at least in part, for the purpose of widening, thickening and surfacing the state highways. As time goes on, however, with the advanced cost of all work, the possibility of the use of Federal Aid for that purpose appears to be vanishing.

Maintenance.

In Appendix "R" will be found a detailed statement of the expenditures for maintenance, together with an analysis of the expenditures.

There were on June 30, 1920, approximately 3100 miles of highway, both graded and paved, under maintenance by the California Highway Commission. These highways then had been under the jurisdiction

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of the Commission and under maintenance by the Commission for an average of 3.70 years.

A total to June 30, 1920, of $3,234,100.15 was expended on general maintenance and for replacements during the entire period that these roads have been under maintenance, or an average expenditure of $281.16 per mile per year. Of the above total mileage approximately 1,724.69 miles are paved and have been under maintenance an average of 4.15 years.

The greater part of the 15-foot by 4-inch concrete base was built during the first three of four years of state highway construction.

An analysis of the maintenance expenditures on these early built roads shows a very low expenditure for the length of time they have been in use.

In 1912, the first year of construction, contracts were let for approximately 100 miles of 15-foot by 4-inch concrete base roads.

On December 31, 1920, these roads had been under traffic for an average of 7.5 years. There has been a total expenditure of $74,400 for maintenance and replacements of the pavement itself throughout this entire period, or approximately $735 per mile. The average expenditure for maintenance and replacements of the pavement base and surface has been $98 per mile per year.

The lowest cost per mile per year has been in Fresno County, between Fresno and the north county line. On this section an average of but $42 has been expended per mile per year for maintenance and replacements of both base and surface during the period of 7.9 years that this road has been under maintenance.

The total average expenditure to June 30, 1920, for maintenance and replacements of all the paved sections is $307 per mile per year. Of this amount only a fractional part has been expended on the maintenance and replacement of the pavement base and surface.

A certain amount of maintenance is necessary on all roads, whether graded or paved, which has nothing to do with the upkeep of the traveled portion of the highway, such as maintenance of earth and macadam shoulders, culverts and drainage, guard rail, noxious weed eradication, care of trees, removal of slides, the restoration of the roadbed after washouts, and the restoration of bridges improperly constructed but included as a part of the state highway system.

Most of these miscellaneous items are essential, and much of this work must be performed even if the paved portion of the road suffers.

When the available funds are small these necessary, miscellaneous items constitute a large percentage of the total expenditure; as the funds increase, so that the necessary work of properly and adequately maintaining, reconstructing and improving the pavement can be performed, the percentage expended on miscellaneous work decreases.

The fund available for the maintenance of the state highways in California has been so small in comparison with the mileage under maintenance, that the miscellaneous expenditures to date have amounted to very nearly 50 per cent of the total expenditures, leaving an entirely inadequate balance available for properly maintaining the paved portion of the roadway.

Thus, of the $307 per mile per year total expenditure on the 1,724.69 miles of paved roads under maintenance, approximately $144, or 47

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Plate XIX. State Highway, Humboldt County, through the Redwoods.



Plate XX. State Highway, Trinity County, near Helena.

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per cent, was expended on the miscellaneous items mentioned above, and $163, or 53 per cent, on maintenance and replacement of the pavement base and surface. This expenditure is less than it should be and the roads show plainly the need of more maintenance money.

It is much regretted that so much of the Motor Vehicle Fund of necessity has been borrowed in the past to eke out the State Highway Fund when the bonds were unsalable and for extensive improvements to the roads in excess of ordinary upkeep. It is true that it is expected to transfer back to the Motor Vehicle Fund these borrowings but nevertheless the reduced fund has caused much embarrassment since it has not been possible to carry on the ordinary repair work in an orderly fashion.

As said before, there is an imperative need for an augumented motor vehicle fund or perhaps better, for a new fund which shall be devoted exclusively to the work of widening and thickening the pavements.

Conclusion.

The last biennium has been a very trying period in the Commission's work as indeed has been the case in all lines of business, public and private.

The assistants and employees of the Commission, notwithstanding the unsettled conditions, almost without exception, have rendered efficient, faithful and loyal service and it has been a pleasure to work with them and to have this opportunity to record the fact.

Respectfully,

A. B. FLETCHER,
Highway Engineer.

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APPENDIX B.

LEGAL DEPARTMENT.

By CHARLES C. CARLETON, Attorney.

The legal department of the California Highway Commission was organized in November, 1911, and the writer hereof placed in charge.

The work of the department has resolved itself into four branches, namely; right of way, claim, legislative and legal, the last more particularly including the rendering of opinions and the handling of court actions.

The right of way work of the department has not been as extensive as might be anticipated, considering the large mileage of new state highway locations, for the reason that the counties of the State of California have concurred in the policy early adopted by the Commission that the rights of way for the state highways be furnished by the respective counties, within the borders of which such rights of way are located, and have through their own county agents solicited and acquired the essential rights of way.

This direct county aid has made unnecessary the creation and maintenance of a large staff composed of the Commission's own right of way agents, and, moreover, has been much more economical for the public, because most of the county agents have served without compensation, being usually impelled by the desire to expedite the construction of a section or sections of state highway in which they are personally interested, and because the local agents can as a rule arrive at much more advantageous terms with the local landowners than could state agents who come as strangers to the particular communities.

While the acquisition of the necessary rights of way by county agents has proven to be a money saving plan, yet, obviously, the right of way work so handled by so many different interests cannot be conducted in as systematic a manner as if a staff of the Commission's own right of way agents handled the work. But thus far it has been considered that the advantage of economy outweighs the disadvantage of not having the right of way records in faultless condition.

Nevertheless, it has been the constant endeavor of the legal department to exercise general supervision and direction over the right of way work of the local agents to the end that the rights of way may be secured in as regular, orderly and efficient a manner as possible.

Chapter 256, Statutes of 1913, provides the legal machinery for such county aid and it also provides a summary procedure for the institution of condemnation proceedings through county district attorneys to acquire state highway rights of way.

A large number of such proceedings have been handled by the county authorities, which service has relieved this department of continuous appearances in court to conduct such cases directly for the state. The legal department, however, has assisted a number of the district attorneys with counsel through the medium of correspondence or personal interviews.

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Again, it is considered that the handling of the right of way actions by the county rather than the state authorities is less expensive and more effective for the reason that the former are closer to their own people and, therefore, can obtain more satisfactory results than if outside attorneys for the State, who would be unacquainted with local conditions, prosecuted the actions.

Prior to the constitutional amendment adopted by the people November 5, 1918 (section 14, article I, constitution of California), the acquisition of rights of way was a more tedious undertaking. This amendment provides that public authorities, in right of way condemnation proceedings, may take immediate possession of desired rights of way by the deposit of money as fixed by the court into court as security at the time of the commencement of the proceedings, but before this amendment was approved no entry could be made upon rights of way sought to be obtained without the consent of the landowners, or in the absence of such consent, judgments of courts of competent jurisdiction after the formality of trials.

Formerly, many grasping landowners took advantage of this situation and would block the public authorities until the time of trial or judgment, thereby making progress of public work of immense importance contingent upon the variable whims and demands of possibly one or a few landowners on sections where all other landowners had either donated rights of way or accepted reasonable terms therefor.

State highway construction will be greatly facilitated by this amendment permitting the immediate possession of necessary rights of way simultaneously with the filing of condemnation papers.

During the last biennial period the legal department has continued to devote considerable time to the disposal of claims filed with the Commission.

These claims are of three classes; those directly against the State of California; those filed by creditors of state highway contractors; and claims of the Commission against its debtors.

The claims against the state are based on contract matters or injuries to persons or property arising out of state highway activities.

The legal department has adjusted a large number of disputed accounts arising out of state highway contracts or other business of the Commission.

In only one instance in the last two years has such a disputed account reached the court and in that action the court held that the claimant had no cause of action against the State of California. This case, entitled *E. T. Johnson* vs. *State of California* (85780, Superior Court City and County of San Francisco), was a notable one in state highway circles. Several years ago E. T. Johnson entered into a contract with the State of California for the construction of a section of state highway in the Shasta River Canyon between Hornbrook and Yreka in Siskiyou County. The contractor completed his contract but entered a claim against the state, claiming that the surveys and estimates made by the engineers of the California Highway Commission were erroneous and that claimant had performed work to the amount of $46,965.33 for which he had not been paid. The Commission's engineers on the contrary asserted that their work had been carefully done and that the

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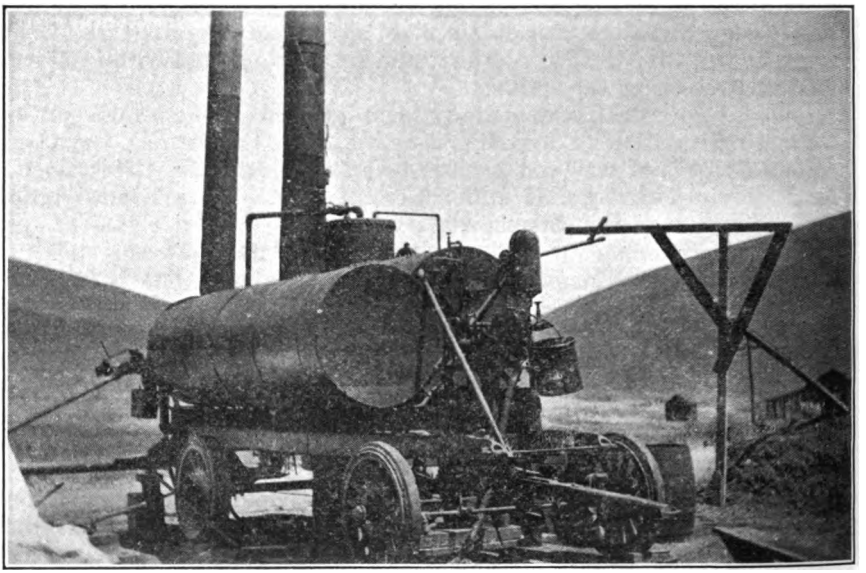


Plate XXI. A Portable Oil Heating Plant of the California Highway Commission.

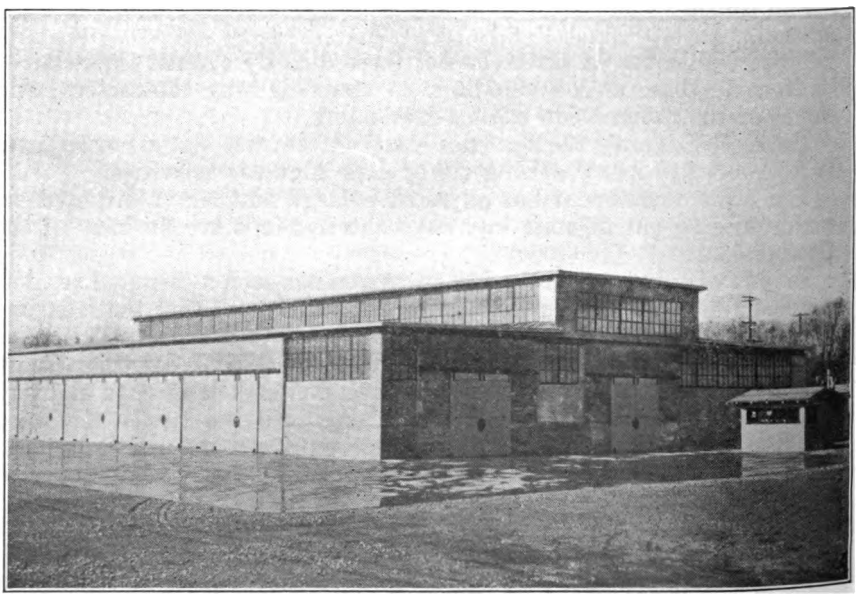


Plate XXII. A Typical Maintenance Yard of the California Highway Commission.

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contractor had been fully compensated for his services. A trial lasting three weeks was held at San Francisco, many eminent engineers of the Pacific Coast being called as expert witnesses.

Judge George A. Sturtevant of the Superior Court of the City and County of San Francisco decided that the state's engineering was carefully done and that no errors, in so far as the testimony showed, were carried into the final estimate, and that he was bound to accept the final estimate as allowed by the California Highway Commission as final and conclusive in the case.

The decision was considered to be a complete vindication of the system of surveys devised and established by the California Highway Commission for the prosecution of state highway work in California. This system is quite closely followed by the Bureau of Public Roads, United States Department of Agriculture, and by the highway departments of the different states. This was the first case in which the California Highway Commission's methods of highway surveying have been questioned.

During the last two years not one action has been commenced against the state or its officers for injury to person or property of others on a claim of negligence of the state or its officers in the construction and maintenance of the state highway system. Such record bespeaks an unusual degree of care exercised in such activities.

The volume of claims filed against the state highway contractors by their creditors has been noticeably smaller the last two years

While the legal department has several cases pending in court at the present time in which the Commission, having withheld money on account of claims against state highway contractors, is offering the same in court to be divided among those found to be entitled thereto by the court, yet as a whole it is apparent that either the contractors are more promptly meeting their obligations or the commercial world is more carefully safeguarding the extension of credit to them.

The department has disposed of the collection of a number of claims of the State of California against persons (or their sureties) who have broken contracts with the state or have injured property under the control of the California Highway Commission.

As a rule, such claims are soon satisfactorily settled and it has not been necessary for a considerable period of time to seek recovery on such claims in the courts.

Briefly reviewing the legislative activities of the legal department, there has been one session of the Legislature during the last biennial period, that of 1919.

The Commission on account of the fact that it had already in previous legislatures obtained legislation necessary to properly perform its functions sought but little new legislation in the 1919 session.

However, many bills were introduced which affected the Commission directly or indirectly and much time of the Attorney was consumed in attending meetings of the Legislature and legislative committees.

The culminating feature of the 1919 Legislature, insofar as the Commission was concerned, was the preparation and passage of the constitutional amendment and special election act providing for the submission of a third state highway bond issue, in amount $40,000,000, to the

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voters of California, which amendment was duly adopted by the people at the special election held on July 1, 1919 (section 2, article XVI of the constitution of California).

The Attorney attends every meeting of the Commission, passing upon such legal questions as arise.

A number of written opinions have been furnished to the Commission on important questions of law arising during the progress of the highway work.

All deeds, contracts, leases, bonds, assignments and other legal instruments of the Commission have been examined and passed upon by the legal department.

A number of appearances have been made before the Railroad Commission in separation of grade and other railroad matters and before other public boards, state and federal, which had jurisdiction over certain phases of state highway operations.

The Attorney has continued to handle all the legal work of the Commission without the employment in any instance of outside counsel.

The Attorney General's office, however, has always been ready and willing to render any special assistance requested.

The cases, in which the California Highway Commission is interested, now pending in the courts at the time of this report, are as follows:

Maryland Casualty Company vs. *T. E. Shafer, et al.,* (B-74900, Superior Court of Los Angeles County). This is an action for the distribution of funds amounting to $10,122.83, impounded in the hands of the Commission on account of claims on a state highway contract.

Maryland Casualty Company vs. *J. H. Shafer, et al.,* (B-74901, Superior Court of Los Angeles County). This is an action for the distribution of funds amounting to $13,829.64, impounded in the hands of the Commission on account of claims on a state highway contract.

Bates and Borland, et al., vs. *Department of Engineering of the State of California* (No. 61289, Superior Court of Alameda County). This is an action commenced in an endeavor to collect the claim of subcontractors against a state highway contractor.

W. R. Ellis vs. *John S. Chambers, et al., W. R. Ellis* vs. *W. D. Stephens, et al.* (Nos. 2208 and 2210, Third Appellate District Court of Appeal, rehearing pending in Supreme Court of California). These are mandamus procedings brought to test the validity of the sale of state highway bonds through the use of Federal Aid road moneys to stimulate such sale.

The plan of such financing may be described as follows:

Out of the Surplus Fund in the state treasury the Board of Control first pays to the State Treasurer the par value of the state highway bonds purchased by it with accrued interest to the date of delivery and takes the bonds into its own physical possession, custody and control.

Thereafter the Board of Control sells and delivers such bonds to a syndicate of bond buyers at a price less than par. Upon the consummation of such sale and the receipt of the moneys arising therefrom the Board of Control, by proper direction to the State Controller and State Treasurer, causes all such moneys to be paid into the Surplus Fund. Simultaneously therewith the Advisory Board of the State Department of Engineering directs the Treasurer to cash certain Federal

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Aid road money checks and from the proceeds thereof to pay a sum into the Surplus Fund in such amount that the sum so paid into the Surplus Fund is exactly equivalent to the sum which would otherwise be obtained from the sale of the bonds should the latter be sold in the open market for par and accrued interest to date of delivery.

The Appellate Court of the State of California has upheld the validity of the above plan and has decided that such transaction is not in violation of the provision of the Surplus Fund Act to the effect that any sale or exchange of bonds purchased by the State Board of Control out of the Surplus Fund shall not be made at a price which will result in a net loss to the state.

The Appellate Court further held that the Advisory Board of the State Department of Engineering was within its powers in directing the crediting of Federal Aid road moneys to the surplus fund.

Rehearing of the matter is now pending in the state Supreme Court.

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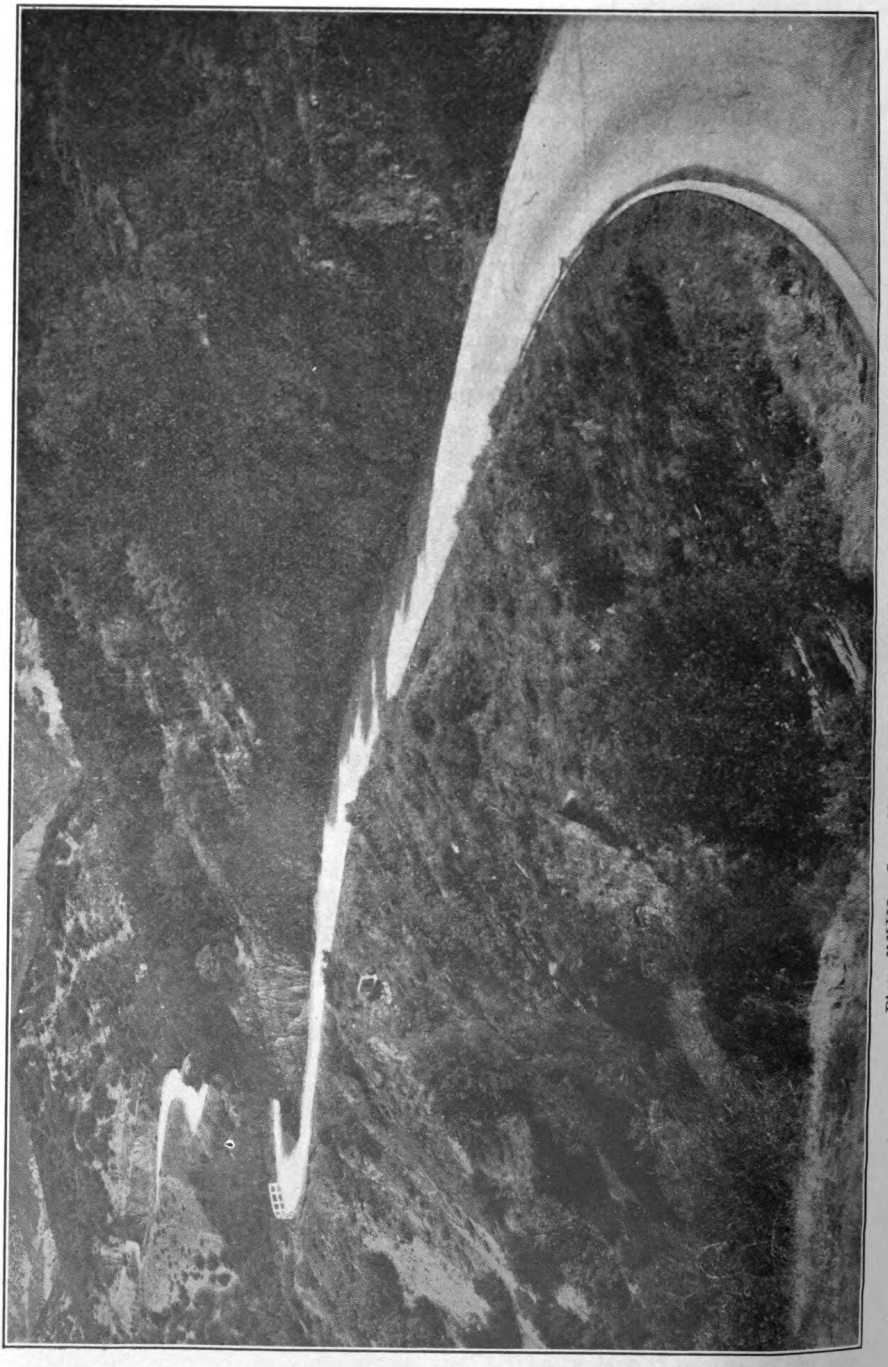


Plate XXIII. State Highway, Los Angeles County, on the Ridge Route.

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APPENDIX C.

GENERAL INSPECTION OF STATE HIGHWAY CONSTRUCTION AND MAINTENANCE.

By T. E. STANTON, Assistant Highway Engineer.

The State of California is divided into seven divisions in each of which all construction and maintenance of State Highways is under the direction of a division engineer.

The magnitude of the state is such that it is impossible for the Highway Engineer, or any of his assistants working out of Sacramento, to give the necessary attention to all of the details of highway surveys, construction and maintenance.

For this reason, it was necessary from the beginning to divide the state into sections or divisions of such size that close attention to the work could be given by a competent highway engineer in charge of each division.

As, however, responsibility for the conduct of the work ultimately rests on the Highway Engineer, who has his headquarters at Sacramento, and who must of necessity spend most of his time at headquarters, disposing of important matters of general policy affecting the work as a whole, and of important matters affecting the work of each division, which are referred to him for approval, it is impossible for him to personally visit the construction work under way throughout the state, with any degree of regularity, or to pass, from personal knowledge, upon the importance or sufficiency of requests from the division offices for appropriations to cover the cost of construction, maintenance and reconstruction.

It is therefore necessary that there be assistant engineers, direct representatives of the Chief Engineer, whose duties it shall be to periodically inspect all construction and maintenance work, and who being familiar with the condition of the highways in all divisions can weigh properly the needs thereof as compared one with the other.

These assistants also aid in standardizing the work, both in the office and field and pass along ideas of value from one division to another.

All construction and maintenance work is carefully inspected and reports thereon made directly to the Highway Engineer, attention being called to any violation of the specifications or of the improper conduct of the work. Special reports are made from time to time, calling attention to unusual conditions and recommendations made relative to work that should be done.

The first contract for State Highway work was awarded in July 1912. By the spring of 1913, thirty-one contracts had been let and the necessity of having a general inspector, operating directly from headquarters, became apparent.

As the seven division engineers were working somewhat independently of each other, it was determined that there should be an intermediary

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to assist in creating and maintaining a high standard of construction, in obtaining the proper interpretation of requirements, methods, and results, throughout the state. The assignment is unique among state highway organizations and in order that no conflict in authority or possible personal friction may tend to nullify the position, considerable tact is necessary.

Mr. Lester H. Gibson, at that time Road Engineer for the Department of Engineering and now Division Engineer of Division V, with headquarters in San Luis Obispo, was appointed to the position in May 1913. Mr. Gibson, who possesses an abundance of ability and tact, made a success of the position from the start.

Owing to the comparatively limited amount of construction work under way at the time and to the fact that no maintenance had as yet become necessary, and that consequently there was no maintenance organization, it was not difficult for Mr. Gibson to visit all of the work at regular and frequent intervals. As the work increased and roads which had been constructed for some time began to require maintenance, the duties of the General Inspector increased to such an extent that it soon required several months for one man to make a complete round of all the highways.

In July of 1920, there were 1990.54 miles of state highway completed and under maintenance and 256.06 miles additional under construction. The ramifications of the state highway system have extended into nearly every county in the state.

Therefore, in January of the present year (1920), Mr. Gibson having meantime been appointed Division Engineer succeeding Mr. Walter C. Howe, at San Luis Obispo, upon the latter's resignation, the state was divided into two districts, an assistant Highway Engineer being assigned to the general inspection in each district.

Mr. R. H. Stalnaker, formerly assistant engineer at headquarters, was assigned to the Northern District, and the writer to the Southern District, the dividing line between the two districts being the northerly boundaries of San Mateo, Alameda, Contra Costa, San Joaquin, Calaveras, and Alpine counties.

Contract, day labor, reconstruction, and maintenance projects are thoroughly inspected. No orders are given to either engineers or workmen, but the division engineer is consulted with, concerning the conduction of the work, and reports are made direct to the Highway Engineer, which inform him of both satisfactory and faulty features of the work.

Compliance with specifications has been the desideratum at all times and such compliance is considered of as much importance on force account work as on contracts.

It is the duty of the general inspector to study camp management as well as the construction features. The method of keeping time on day labor contracts, the prevailing scale of wages, the handling of accounts and the system of managing and accounting for the commissary supplies receive due attention.

In addition to the duties of general inspector, these inspectors are frequently detailed on special assignments, such as a study of and report on special types and methods of construction, either by state, counties or cities.

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The work leads to an interchange of ideas among the division engineers, and a uniformity of inspection and standardization of working methods is thus brought about.

Once each month a conference of all heads of departments is held at headquarters in Sacramento. This conference gives the general inspector an opportunity to bring up for discussion matters of importance noted in his travels, and in this way uniformity of work is secured in addition to calling to the attention of all, important matters which demand general attention. Each one is encouraged to give expression to ideas which will raise the standards and give opportunity for doing better work.

California is a very large state and as every variety of climate and of road building conditions is to be found herein, as well as some which may be considered as peculiar to few states outside of California, there are many problems to be solved.

From the excessive heat and special construction methods required in the Imperial Valley and the Colorado Desert sand dunes, to the cold and snow of the northern counties, all conditions and requirements of road building are to be found, not overlooking the special problems encountered in the Sacramento Valley where the roadbed has been saturated with the alkali water from the rice fields.

The general inspector is thus called upon to be familiar with and to be able to criticise and advise on all types of highway construction. The varied topographical features in California have rendered a great deal of pioneering necessary and the setting up of standards, many of the features of which are being adopted in other states of the Union.

The California Highway Commission and the Highway Engineer have always treated the great work for which they are responsible, as a business proposition in which efficiency and economy are as important as in any big privately controlled project. The minds of all are continually set on the problem of raising the standards of highway construction and the general inspector has a niche to fill in the general scheme of organization, which if properly filled, bears an important part in the attainment of the desired end.

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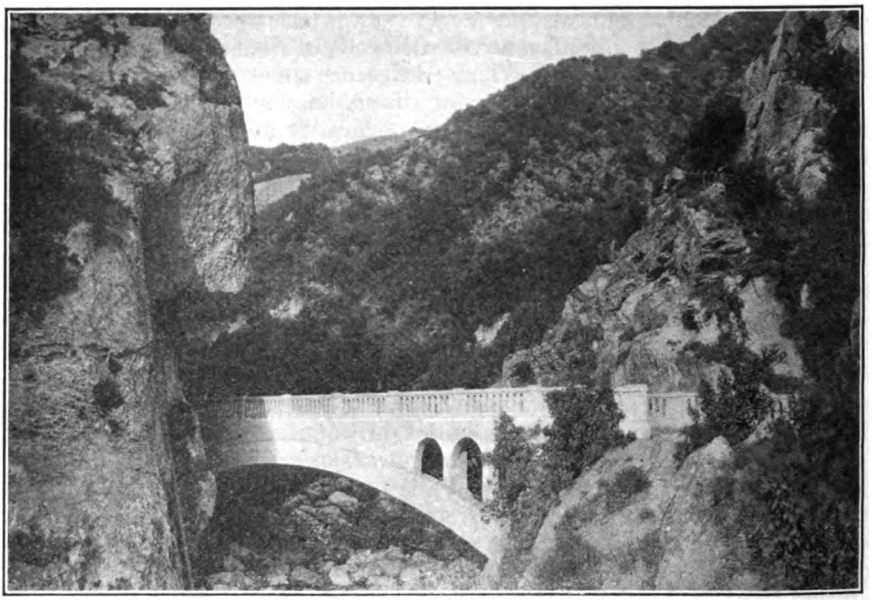


Plate XXIV. Bridge on State Highway, Santa Barbara County, over Gaviota Creek.

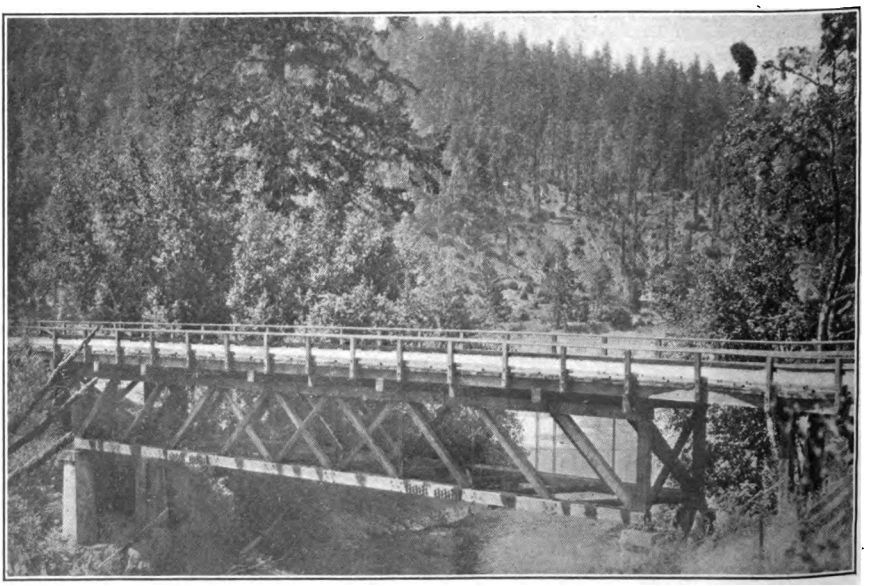


Plate XXV. Bridge on State Highway, Mendocino County, over Red Mountain Creek.

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APPENDIX D.

FEDERAL AID HIGHWAYS IN CALIFORNIA.

By A. J. WAGNER, Assistant Highway Engineer.

Federal Aid Road Act.

On July 11, 1916, the President of the United States approved a measure generally known as the Federal Aid Road Act, which appropriated the sum of $75,000,000 for the purpose of cooperating with the various states, through their respective state highway departments, in the construction of rural post routes. This act also carried an appropriation of $10,000,000 to be expended for the construction and maintenance of roads and trails in the national forests.

Unfortunately this act contained three limitations which were preventing the law from becoming an effective method of procedure between the federal government and the individual states. The law was founded upon the principle of cooperation for the purpose of stimulating road production and of aiding the states in their individual efforts. It was found that practically all of the states were limited in proceeding along the lines of an adequate program: (*a*) By the post road requirements; (*b*) By the limitation of federal participation to $10,000 per mile; and (*c*) by the amount of the appropriation carried.

In California as in other states the rural mail carrier does not always follow throughout their length those roads on which traffic is concentrated. As these roads naturally are the ones that require the first efforts of the Highway Commission, it rapidly became apparent that Federal Aid under the existing law was not logical and that a more flexible definition of rural post routes would be required.

The limitation of $10,000 per mile for federal participation was reasonable at the time the law was conceived, but at the time of the passage of the act the cost of road construction was increased rapidly and by the end of 1918 the federal government's limit of $10,000 per mile would not pay 50 per cent of the cost of the majority of hard surfaced roads being constructed throughout the United States.

In the early part of 1919 the sixty-fifth Congress amended the original act removing the three objections heretofore enumerated. This bill, known as H. R. 13,308, approved February 28, 1919, defined the term "rural post road" so as to permit the improvement of roads which could not qualify under the original definition. The limitation of $10,000 per mile was increased to $20,000 per mile exclusive of bridges over 20 feet clear span. The original appropriation of $75,000,000 which was available for the fiscal years 1916–1921, was increased by $200,000,000, of which $50,000,000 was available at once, $75,000,000 on July 1, 1919 and $75,000,000 on July 1, 1920.

For administering the provisions of the Federal Aid Road Act the Secretary of Agriculture is authorized to use a sum not to exceed 3 per cent. This administration is vested in the Bureau of Public Roads of the Department of Agriculture.

The apportionment of the Federal Aid appropriations to the various states, after deducting the 3 per cent for administration, is based on area, population, and the mileage of rural mail routes.

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Under the terms of the Federal Aid Road Act the apportionment of each state for each fiscal year remains available for expenditure until the close of the succeeding fiscal year, but it is construed that funds covered by agreements are expended within the meaning of the law.

California's allotment for the fiscal years 1916–1921 reaches a total of $8,384,354.57. This apportionment is shown in detail in the following table:

FEDERAL AID ALLOTMENTS.

$75,000,000 Fund.

Year 1917	$151,063 92
Year 1918	302,127 84
Year 1919	456,167 23
Year 1920	609,699 32
Year 1921	763,688 88

$200,000,000 Fund.

Year 1919	1,524,248 30
Year 1920	2,286,372 45
Year 1921	2,291,006 63
Total	$8,384,354 57

In order that a state may receive the benefits of the Federal Aid Road Act it must have a State Highway Department. The construction on which federal funds are to be expended must be done under the direct supervision of that department. An amount at least equal to the federal funds must be made available by or on behalf of the state. The federal act also requires that, as a condition precedent to participation in the benefits of the Federal Aid Road Act, the Legislature shall assent to the terms of the federal act. An act expressing assent of the State of California to the provisions of the Federal Aid Road Act was approved by the Governor March 21, 1917 (Statutes 1917, p. 20).

A considerable amount of misunderstanding prevails in this state as to the means by which Federal Aid may be secured. Many County officials and private citizens do not understand that applications for Federal Aid are handled only through the State Highway Commission and that the initial power of selection of roads upon which federal funds are to be expended rests only with the California Highway Commission.

Method of Procedure.

The procedure adopted by the Bureau of Public Roads calls for the filing of an application, known as a project statement, with the District Engineer of the Bureau. This application must contain certain data relative to the carriage of the United States mails over the proposed roads, an approximate traffic census, type of construction, source of the state's share of funds, an approximate estimate of cost, amount of Federal Aid desired and the state's depository.

The federal authorities then examine the project statement and if it is approved it is transmitted to Washington.

On receipt of notification of approval, the California Highway Commission submits its plans, cross-sections, specifications and an estimate of cost of the proposed road. These documents are checked by the district office of the Bureau of Public Roads, and if found satisfactory,

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a recommendation to that effect is made to the Secretary of Agriculture. On the issuance of a recommendation by the District Engineer, contracts may be awarded and work started. On receipt of the District Engineer's recommendation by the authorities at Washington a certificate to that effect is issued by the Secretary of Agriculture, to the Secretary of the Treasury and the State Highway Commission. A formal project agreement is then entered into between the Secretary of Agriculture and the California Highway Commission.

As the work progresses, payments are made to the State Treasurer by the Federal Comptroller of the Treasury covering the government's share of the work. Before payment is made the state must show by suitable vouchers, that the money has actually been spent on the project designated. In other words, federal aid is a reimbursement for work done, not a donation for work contemplated.

The District Engineer of the Bureau of Public Roads, whose headquarters for this district are in San Francisco, is charged with the duty of seeing that the provisions of the Federal Aid Act are carried out. He must satisfy himself that the work is substantial in character, that all work is being carried out in accordance with the agreement, and that the materials entering into the structure are the best available.

Under the rules and regulations adopted by the Department of Agriculture, a standard as to form and arrangement of plans, estimates and specifications was required. All of the plans, specifications and estimates prepared by the California Highway Commission engineers both for state work and federal aid projects conform to the above regulations.

Construction.

Actual construction on the first Federal Aid project was started in 1916, project number one being that section of state highway between Beresford and Redwood City in San Mateo County.

Due to the limitations heretofore set forth, active construction on any further Federal Aid projects was not started until the spring of 1919. Since that date 32 contracts have been awarded on which federal participation was secured. Of these contracts 171 miles were for constructing concrete base; 130 miles were for graded roads; and one bridge contract was awarded. The above projects involve an expenditure of about $3,000,000 by the federal government.

Conclusion.

The policy of the Highway Commission has been to apply the Federal Aid as much as possible to projects in the poorer counties of the state, thereby relieving them of interest charges.

With the success of the proposed initiative which will come before the people in November, greater activities will ensue and it is highly probable that California's allotment of $8,384,354.57 will be taken up and expended by the end of 1922.

The following table records all Federal Aid projects under agreement on June 30, 1920, together with the reimbursements to the state made by the federal government to that date on the projects:

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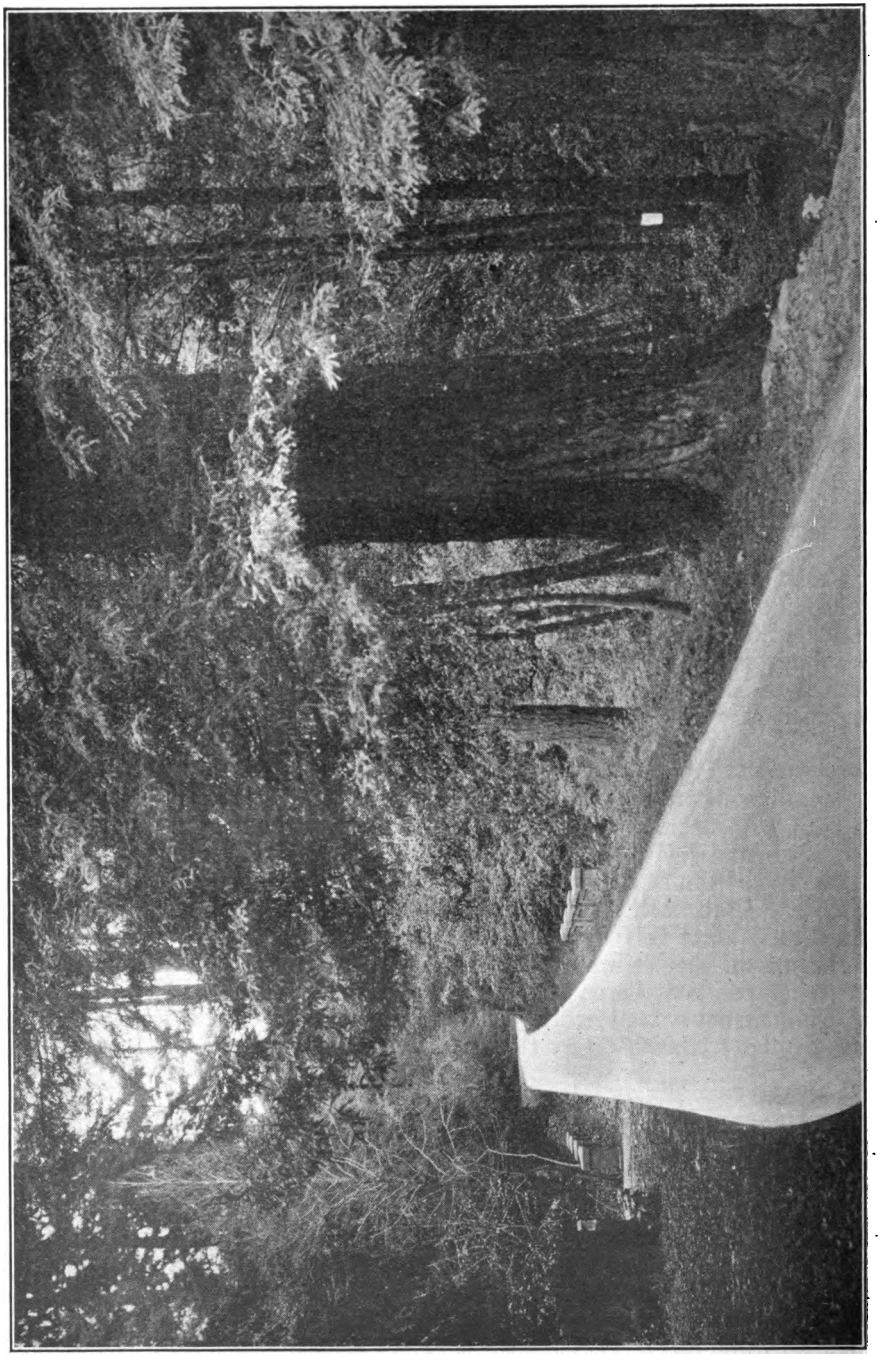


Plate XXVI. State Highway, Santa Cruz County, near Glenwood.

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RECORD OF FEDERAL AID PROJECTS JUNE 30, 1920.

Project No.	Contract No	Road	From	To	Length	Type	Project Statement Approved	Total Estimated Cost	Amount Requested	Plans & Est Approved by Dist. Engr.	Project Agreement Executed	Amount Recommended	Miles Constructed (By Years) 1916	1917	1918	1919	1920	Rate of Completion	Apportioned 1917-21 $9,324,354.77 Balance Available	Reimbursements
1	167	IV-S.M-2-B	Beresford	Redwood City	4.26	20 ft. Concrete Base	[illegible]	60,103.79	40,061.89		11-21-16	35,287.30	1.0	3.26				9-18-17	8,349,027.37	35,327.30
2		VI-Ven-2-C	Springfield	Santa Clara River		20' Asphalt on Con.Base	[illegible]	56,814.21	28,407.10		11-21-16	24,244.85	1.5	1.00				7-25-17	8,324,782.81	24,244.56
3	170	VI-S.C-14-A	Richmond	Alameda			[illegible]													
4	---	II-Sac-1-C	Colete	Beatrice			[illegible]													
5	---	III-Pla-17-A	Meneville	Penyra			[illegible]													
6	241	II-Sac-2-C	Across the Sacramento	River & Salt Creek		Bridge	[illegible]													
7	---	II-Sac-2-AAB	Tower House	Reading	15.94	Grading	[illegible]	[illegible]	[illegible]	6-14-18	6-24-18	108,334.34				11.9	4.0		8,219,448.97	
8	---	II-Sis-1-B-P	Douglas City	Hurst Ranch	45.00	Grading	[illegible]	[illegible]	[illegible]											
9	B-231	II-Sis-1-AA-B	Table Bar Creek	Helena	11.40	Grading	[illegible]	[illegible]	[illegible]											
		II-Sis-1-B-12-G	Tecate Divide	Easterly Boundary	13.20	Grading & 19' Conc.Base	[illegible]	[illegible]	[illegible]	5-26-18	[illegible]	[illegible]								
10	D-236	II-Ala-20-A	Alta Summit	Cooby	10.86	Grading	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]								
11	242	II-Yol-10-B	Coalinga	Oil City School	0.17	15 ft. Concrete Base	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]								
12	242	VI-Mer-16-A	Merced	Easterly Boundary	14.89	15 ft. Concrete Base	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]								
13	D-247 Amend	VI-Lak-1-A & C	Bay Ranch	Lakes Mountain	17.53	20 ft. Concrete Base	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]				17.53		11-15-19	[illegible]	[illegible]
14	---	I-Mon-1-AAA	Arnold	Battlesnake Summit	25.00	Grading	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]								
14A	[illegible]	I-Mon-1-AAA	Arnold	Battlesnake Summit	24.12	Grading	[illegible]	[illegible]	[illegible]											
15	[illegible]	[illegible]	King City	Bridge & 15' Conc.Base	1.26	Bridge & 15' Conc.Base	[illegible]	[illegible]	[illegible]	5-29-19	8-1-19	76,473.66				21.5			7,433,137.49	61,943.94
15A	[illegible]	[illegible]	Across Salinas River	So. Bank Salinas River	[illegible]	Steel Bridge & Conc.Trestle	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]								
15B	[illegible]	[illegible]	Creek Inter Lagoon	Orick	2.00	Grading	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]								
16	[illegible]	I-Mon-1-B	Last Chance Silde	Cushion Creek	7.73	Grading	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]				1.7	2.4		[illegible]	[illegible]
16	---	I-Mon-1-C	Beatrice	Eureka	7.94	15 ft.Con.Base & Asphalt Sur	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]								
16A	D-[illegible]	I-Mon-1-C	Beatrice	Eureka	7.43	15 ft. Concrete Base	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]								
17	[illegible]	I-Mon-16-A	Woodland	Easterly Boundary.	6.00	Grading	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]				6.0				49,919.85
18	[illegible]	I-Lak-16-A	Westerly Boundary	Lakeport	5.00	Grading	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]								
21	[illegible]	VII-Ven-2-AAB	Southerly Boundary	Conejo Grade	5.19	18 ft. Concrete Base	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]				5.2				
[illegible]	[illegible]	[illegible]	Russell Ranch	Forner Easterly Bdy.	1.00	16 ft. Concrete Base	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]								
[illegible]	[illegible]	[illegible]	Lamberahim Blvd.	South Sheraan Way	[illegible]	Conc. Bent & Conc.Surf.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]				1.9				
[illegible]	[illegible]	[illegible]	Galiyan	Irving	[illegible]	Conc. Trest.Surf.& Conc.Slide	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]								
[illegible]	[illegible]	[illegible]	Divide	Orosi	3.56	15 ft. Concrete Base	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]				.5				
26	D-[illegible]	VI-Ker-4-A	Southerly Boundary	Near Rose Station	10.73	20 ft. Concrete Base	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]				.5	2.5			
[illegible]	[illegible]	III-Sta-13-B	Oakdale	Easterly Boundary	12.79	15 ft. Concrete Base	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]				1.1	5.2			16,560.87
[illegible]	[illegible]	III-Ala-17-C	Auburn	Westerly Boundary	6.08	15 ft. Concrete Base	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]								
[illegible]	[illegible]	III-Amo-10-A	Ione	Jackson	10.74	Grading	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]								
[illegible]	[illegible]	III-Tuo-5-AAB	Easterly Boundary	Sonora	21.30	15 ft. Concrete Base	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]								
[illegible]	263	I-Mon-1-B	Cushion Creek	Crescent City	4.00	Grading	[illegible]	97,310.00	18,568.36	10-24-19	1-17-20	18,568.36					2.5		6,274,154.84	
[illegible]	[illegible]	II-Sis-3-B	Yreka	Gazelle	17.64	15 ft. Concrete Base	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]								
[illegible]	[illegible]	VII-S.M.-Riv-26-BAA	County Highway #32	Beaumont	7.10	Grading	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]								
[illegible]	[illegible]	VII-Sd.-Pri-VV-1	Pine Valley	Cabera Ranch	1.61	Grading	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]								
[illegible]	[illegible]	VII-Sd.-Pri-VV-2	Cabera Ranch	Tecate Divide	15.80	15 ft. Concrete Base	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]								
[illegible]	[illegible]	I-Mon-1-F	Rio Dell	Fortuna	7.34	15 ft. Concrete Base	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]								
[illegible]	[illegible]	VI-Fre-10-A	Oil King School	Huron Road	11.99	15 ft. Concrete Base	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]								
[illegible]	[illegible]	VI-Mar-16-A	Mariposa	Sierra National Forest	7.84	Grading	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]								
[illegible]	[illegible]	VI-Ker-25-B	N.& Cor.Sec.6,T.7S.,R6E	Easterly Boundary	14.33	15 ft. Concrete Base	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]								
[illegible]	[illegible]	VII-Ker-26-B	600 ft. West of Inyo	Southern Pac. Crossing	0.11	Concrete Base	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]								
[illegible]	[illegible]	VII-Ker-26-D	Tule Bank	Gravel Bank	6.53	15 ft. Concrete Base	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]								
[illegible]	D-304	VII-Ker-26-E	Gravel Bank	Northerly Boundary	8.33	15 ft. Concrete Base	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]								
[illegible]	[illegible]	II-Teh-3-D	Los Molinos	Red Bluff	15.17	15 ft. Concrete Base	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]								
[illegible]	D-[illegible]	VI-Mon-16-E	El Portal	Yosemite Natl. Park	1.28	15 ft. Concrete Base	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]								
[illegible]	[illegible]	VII-Yol-7-B	Woodland	Zamora	10.71	15 & 18 ft. Conc. Base	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]								
[illegible]	[illegible]	I-Hum-2-C	Redwood Creek	Three Creeks			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]								
[illegible]	[illegible]	I-Mon-1-DAA	Dyerville	Rio Dell	17.96	15 ft. Concrete Base	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]								
[illegible]	[illegible]	VI-Mon-16-E	Sierra Natl. Forest	4 mi. No. of Bricelburg	9.39	Grading	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]								
[illegible]	[illegible]	VI-Sol.-Ven-B	Southerly Boundary	Los Gatos	8.09	15 ft. Concrete Base	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]								
[illegible]	[illegible]	VI-Ala-17-A	Glenwood	Easterly Boundary	5.00	15 ft. Concrete Base	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]								
[illegible]	[illegible]	VI-Ala-17-F	Moron Road	Easterly Boundary	5.00	15 ft. Concrete Base	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]								
[illegible]	269	VII-S.B-12-C	Plima Springs	Alpine	6.67	15 ft. Concrete Base	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]								
[illegible]	[illegible]	I-Mon-1-D-E & F	Forbeythe Creek	Outlet Creek	17.80	15 ft. Concrete Base	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]								
[illegible]	[illegible]	VI-Mar-16-E	4 mi. No. of Bricelburg	Clearinghouse	7.27	Grading	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]								
[illegible]	[illegible]	VI-Mar-16-D	Clearinghouse	El Portal	5.69	Grading	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]								
[illegible]	269	VII-S.B-12-D	Alpine	The Willows	4.28	15 ft. Concrete Base	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]								
[illegible]	[illegible]	II- Sha-3-A	Southerly Boundary	Redding	18.87	15 ft. Concrete Base	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]								
[illegible]	[illegible]	II-Teh-3-C	Red Bluff	Northerly Boundary	13.60	15 ft. Concrete Base	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]								
[illegible]	[illegible]	VI-S.B.-2-D-E	Los Cruces	Zaca	14.84	15 & 20 ft. Conc. Base	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]								
[illegible]	[illegible]	VI-S.L.O.-33-A	Paso Robles	Estrella River	11.54	15 ft. Concrete Base	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]								
TOTALS					884.63 *			12,797,238.56 *	6,129,279.54			2,920,136.72	2.5	4.26		79.72	80.33			880,480.77

* Balance available based on "Amount Recommended" in Project Agreement unless otherwise noted.
* Final Voucher "Balance Available" based on this amount.
* Total does not include amounts shown for Projects 14A, 15A and 15B.

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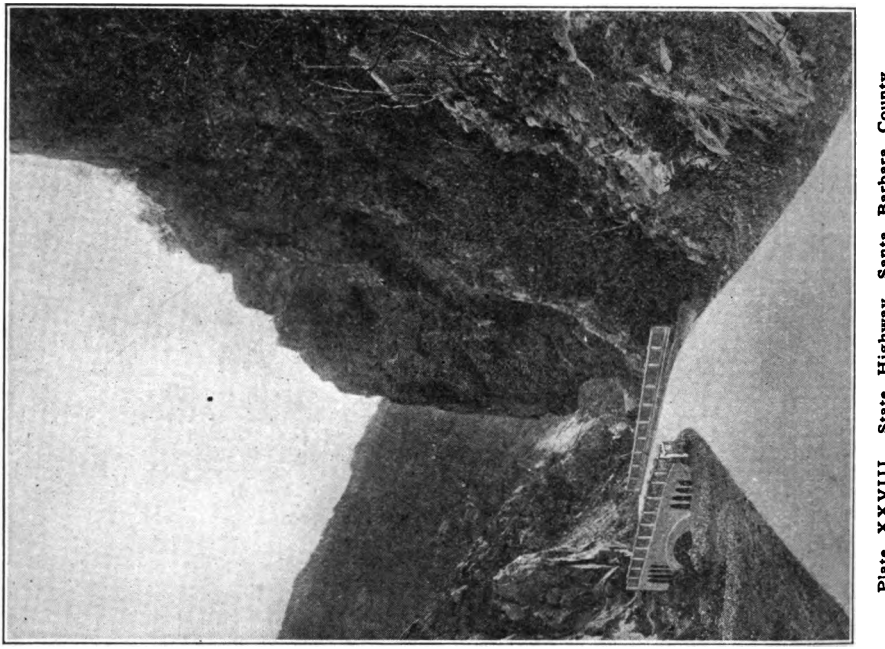


Plate XXVIII. State Highway, Santa Barbara County, in Gaviota Gorge.

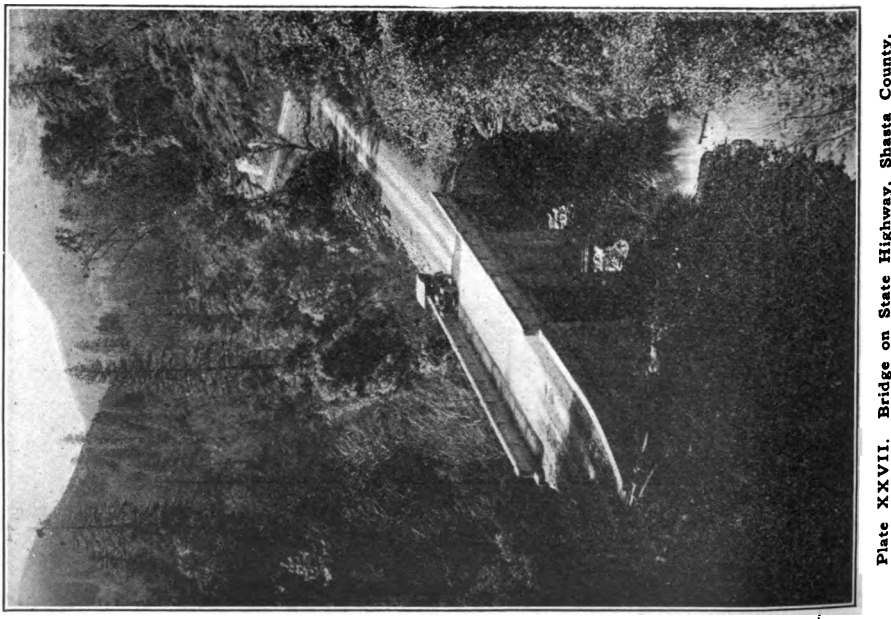


Plate XXVII. Bridge on State Highway, Shasta County, over Dog Creek.

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APPENDIX E.

EXCESS WAR MATERIAL FROM THE FEDERAL GOVERNMENT.

By W. J. GOUGH, Assistant Highway Engineer.

The Sixty-fifth Congress in the Post Office Appropriation Act (H. R. 13308; signed February 28, 1919), enacted as follows:

Sec. 7. That the Secretary of War be, and he is hereby, authorized in his discretion to transfer to the Secretary of Agriculture all available war material, equipment, and supplies not needed for the purposes of the War Department, but suitable for use in the improvement of highways, and that the same be distributed among the highway departments of the several states to be used on roads constructed in whole or in part by Federal Aid, such distribution to be made upon a value basis of distribution the same as provided by the Federal Aid Road Act, approved July 11, 1916; *provided*, That the Secretary of Agriculture, at his discretion, may reserve from such distribution not to exceed ten per centum of such material, equipment, and supplies for use in the construction of national forest roads or other roads constructed under his direct supervision.

Acting for the Secretary of Agriculture, the United States Bureau of Public Roads took charge of the distribution of the equipment which at first consisted almost exclusively of motor vehicles. Later, to make more definite the meaning of the law, the so-called Kahn bill (Senate 3037; approved March 15, 1920) was passed by Congress.

This act, while including the requirements of the Post Office Appropriation Act, went so far as to mention specifically such war materials, supplies, etc., "As are or may hereafter be found to be surplus and not required for military purposes"; also provided "No more motor propelled vehicles, motor equipment and other war material, equipment and supplies, the transfer of which is authorized in this act, shall be transferred to the Department of Agriculture for the purpose" of improving highways "than said Department of Agriculture shall certify can be efficiently used for such purposes within a reasonable time after such transfer"; and further provided "Any state receiving any of said property for use in the improvement of public highways shall, as to the property it receives, pay to the Department of Agriculture the amount of 20 per centum of the estimated value of said property as fixed by the Secretary of Agriculture or under his direction, against which sum the said state may set off all freight charges paid by it on the shipment of said property, not to exceed, however, said 20 per centum."

After the passage of the Kahn bill and on receipt of a request from the Bureau of Public Roads that a statement be submitted showing such construction equipment as was desired other than trucks, a list of material was made up roughly estimated to amount to $1,250,000 in value and in April, 1920, a representative of the Commission was sent to Washington to deliver the list and to endeavor to secure the equipment.

Some of the surplus equipment so listed has been received and shipments are arriving almost daily.

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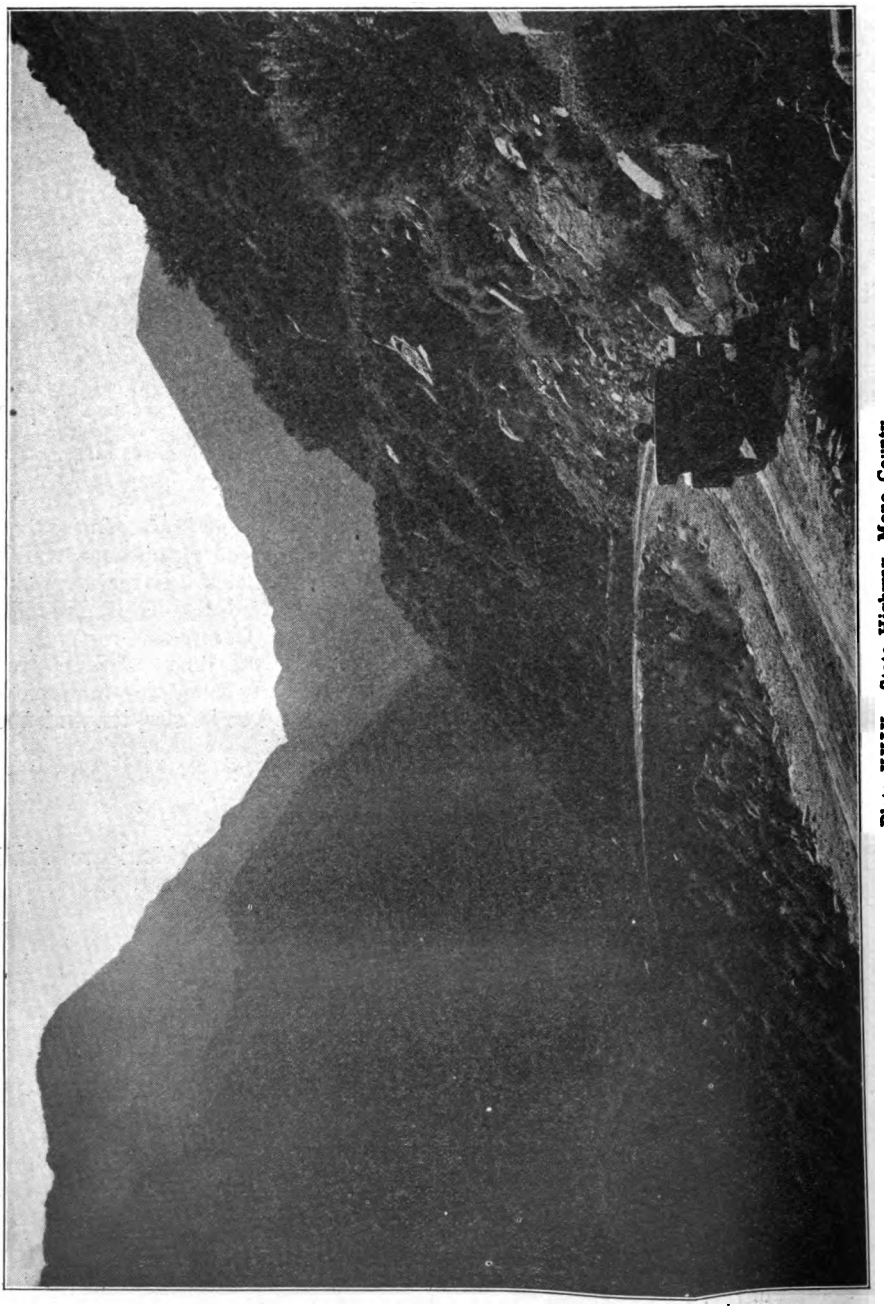


Plate XXIX. State Highway, Mono County.

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Motor Trucks and Automobiles.

Under four general allotments 622 motor trucks, 77 Fords, and 15 automobiles were named as California's proportion, estimated to be worth a little more than three per cent of the total value of the equipment declared available for allotment.

To October, 1920, there have been received 603 trucks, 75 Fords, and 14 automobiles. These motor vehicles cost the state only the freight charges plus the expenses of handling and they are shown on the books of the Commission at what they cost the state. Their intrinsic value, however, has been estimated at approximately $1,600,000.

In the early stages of this distribution very little information could be obtained as to the make, capacity and condition of the equipment available for shipment, and aside from being advised that the Commission would receive a number of motor vehicles in accordance with the general allotments, almost no opportunity was ever given to determine whether the value of the motor equipment allotted would equal the charges involved in procuring it.

However, as the total freight and handling charges on such of the equipment as came by rail and which was received on or before October 20, 1920, amounted to but $125,000, approximately, less than 8 per cent of the estimated value of the equipment, it cannot be said that the state has lost by the transaction.

All motor equipment received, whether new or old, required a general overhauling prior to being placed in service. The outlay necessary for this overhauling, fitting with bodies, dump equipment, etc., to October 1, 1920, has aggregated about $65,000.

Among the first trucks received were twenty-eight 3-ton heavy aviation units without bodies. An effort was made immediately to secure body and hoist equipment so as to make a complete dump outfit of each unit. Owing to the limited factory output of the manufacturers and to a car scarcity which existed at the time, the Commission's forces undertook to make all truck bodies and purchased a type of hoist then carried in stock on the coast.

Each of the new two-ton Nash Quad trucks when received was equipped with a combined riveted and pressed steel "ammunition" body measuring 9 feet 6 inches long, 3 feet 6 inches wide, and 3 feet high, with a tailgate made in two parts and opening like hinged double barn doors. This body was riveted and bolted on the truck chassis, and because of its form it was wholly unsuited for highway work.

To discard these special bodies and supply the trucks with two-ton capacity commercial bodies purchased at the prevailing prices would have required an expenditure of about $360 each, so the "ammunition" bodies were remodeled to a general utility type with dimensions 9 feet 6 inches long, 6 feet wide and of just sufficient height to limit the load to a safe carrying capacity. This remodeling was entirely successful and so far has resulted in a saving to the Commission of $155 on each fixed or end dump unit constructed.

These remodeled bodies proved so satisfactory that their use was extended to units of three and five-ton carrying capacity, with satisfactory results. Additional ammunition bodies being required, they were

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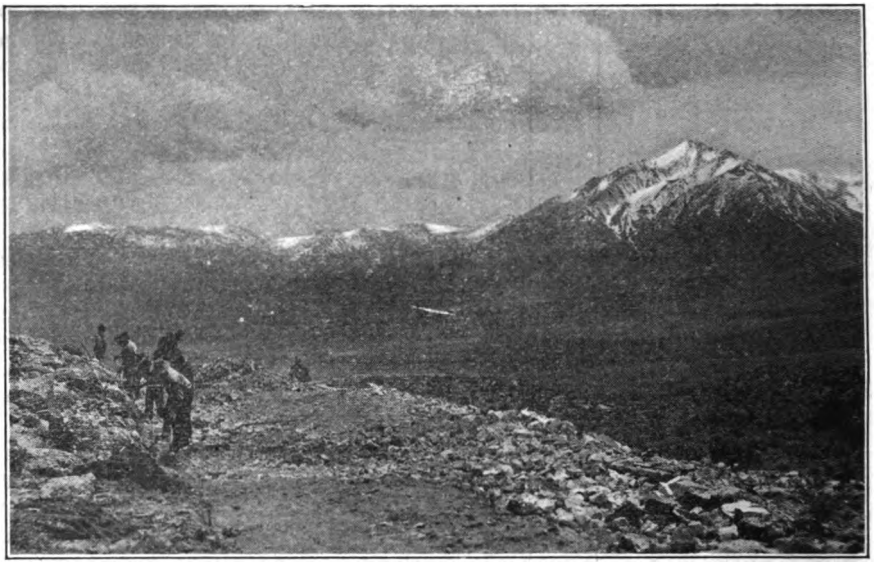


Plate XXX. State Highway, Mono County, Under Construction.

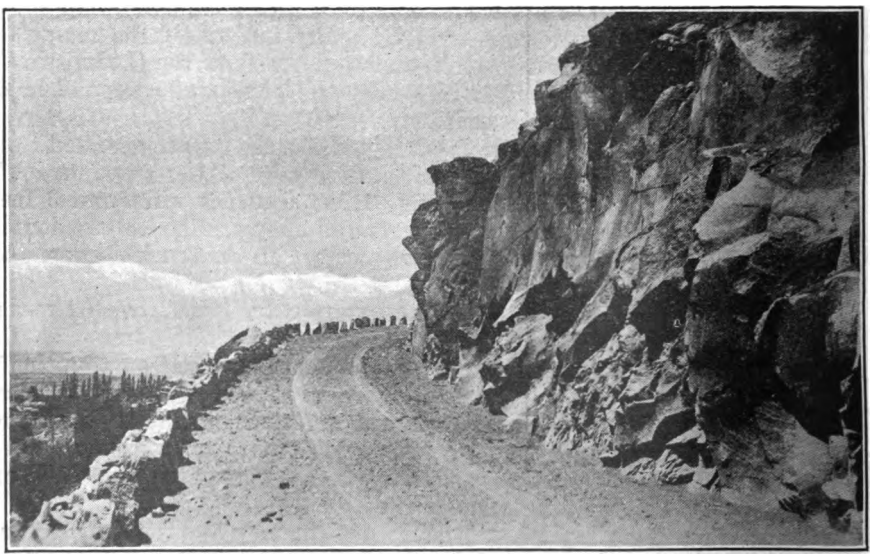


Plate XXXI. State Highway, Mono County.

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secured from the Michigan State Highway Department through the Bureau of Public Roads.

Only three dump trucks were received from the federal government. The Commission, however, has equipped most of the three-ton and all of the five-ton capacity units with vertical hydraulic power hoists, which make them very efficient for long distance hauling.

Distribution of the Motor Vehicles.

The trucks have been distributed throughout the state and placed in charge of the division engineers with the exception of the surplus ones not needed immediately for the work. The surplus trucks are stored at Sacramento and at Los Angeles.

An attempt, more or less successful, was made to allot to each division the type of truck best adapted to the locality where it was to be used.

The Commission on April 23 and June 28, 1920, authorized the assignment of two trucks to each county in the state for use on county road work, and up to October 1, 1920, many of the counties availed themselves of the offer. Eighty-nine units having an estimated value of about $192,000 had been then distributed, all of these trucks so allotted being subject to properly executed leases. The lease calls for an initial payment of all the expenses to which the Commission has been put in securing the vehicle, in addition to which one dollar per year rental is required. After one year from the date of the lease, on thirty day's notice from the Commission, the truck must be returned in as good condition as received less ordinary wear and tear. An endeavor is made to secure bi-monthly reports as to the condition of each truck.

Buildings for Storing Equipment.

It is obvious that shelter had to be provided for the large quantity of equipment received and to be received from the government and the Commission has acquired structures by purchase and by construction to the limit of its financial ability. The storage facilities are not adequate, however, and a considerable sum must be expended as soon as funds are available.

It is intended to erect a large shop and warehouse at Sacramento, on land already acquired, where the major portion of the extensive repair of the equipment will be performed.

In some cases warehouses have been rented to store the equipment temporarily and use has been made of the sheds at the State Fair grounds and the city corporation yard at Sacramento through the kindness of the officials in charge.

During the fiscal year of 1919-1920 buildings aggregating 45,950 square feet of floor space were acquired, either through purchase or by erection, and the following table shows their location, character and other data. The building at Redding was purchased with the ground and both were included in the price of $4,000 shown in table:

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Location	Character	Floor space	Cost with necessary improvement
Willits ----------Division I	Wooden shed ----------	3,168 square feet	$480 00
Willits ----------Division I	Wood and corrugated iron----	3,360 square feet	5,550 00
Redding ----------Division II	Corrugated iron shed----------	4,032 square feet	2,150 00
Redding ----------Division II	Corrugated iron building-----	6,650 square feet	4,000 00
Sacramento --------Division III	Wood and steel----------	2,400 square feet	2,800 00
Fruitvale ----------Division IV	Semi-fireproof ----------	10,800 square feet	28,200 00
Petaluma ----------Division IV	Wood and corrugated iron----	4,320 square feet	12,000 00
San Luis Obispo---Division V	Wood and corrugated iron----	4 320 square feet	4,500 00
Lankershim --------Division VII	Fireproof ----------	5,400 square feet	16,684 00
Calabasas ---------Division VII	----------	1,500 square feet	2,500 00
	Total----------	45,950 square feet	$78,864 00

Facilities for making minor repairs have been supplied to the buildings at Sacramento, Oakland, San Luis Obispo and Lankershim, and when the shop at Sacramento is built it is intended to equip it with such machinery and tools as are required for the general repair of state equipment.

It is hoped and expected that most of these machines and tools will be received from the surplus war equipment stock.

Construction Equipment and Supplies.

Of the machinery, supplies and other construction units allotted to the state other than trucks, only a portion has been received, estimated to be worth about $564,000. As in the case of the motor equipment these materials and supplies are carried on the books of the Commission at their cost to the state and not at their intrinsic value.

Of these items, the sum of $304,000 is estimated as the value of certain T.N.T. and other high explosives received from the government, as follows:

1,500,000 pounds of T.N.T.
200,000 pounds of hand grenade powder.
50,000 pounds of black blasting powder.

Payments Required From State.

The Kahn bill, before mentioned, stipulates that all states receiving equipment under its provisions are required to pay 20 per cent of the estimated value of such as determined by the Secretary of Agriculture but that the amount of freight paid to secure same, not exceeding the 20 per cent, may be deducted.

Some confusion exists, as to some of the equipment received, concerning what the state will have to pay. Some equipment originally allotted under the Post Office Appropriation Act has been received under government shipping tickets, apparently applying to a later act known as the Kahn bill. In most cases, however, it matters little, since, under both acts, the state pays the freight charges and usually such charges equal or exceed the 20 per cent of the government's appraised values.

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MISCELLANEOUS EXCESS WAR MATERIALS RECEIVED FROM UNITED STATES GOVERNMENT.

Description	Quantity received	Condition	Shipped from
Brooms, stable, with handles	845	Good	Omaha, Neb.
Buckets, clamshell, Lakewood, ½-yard	3	Good	Kearney, N. J.
Buckets, clamshell, ½-yard	3	Good	Kearney, N. J.
Buckets, orangepeel, 1-yard	1	Fair	Norfolk, Va.
Cable, ½-inch	1,200 feet	Good	Toledo, Ohio
Cable, ⅝-inch	400 feet	Poor	Toledo, Ohio
Cable, 1⅛-inch	2,019 feet	Fair	Toledo, Ohio
Carts, water, 165-gal.	14	Fair	San Francisco, Cal.
Carts, concrete, push, ¼ cubic yard	6	Good	Norfolk, Va.
Carts, concrete, push, ½ cubic yard	19	Good	New Cumberland, Pa.
Chains, Stanley, non-skid	30	Good	Holabird, Md.
Chains, Stanley, non-skid, 40"x6"	10	Good	Holabird, Md.
Chains, Packard	280	Good	Chicago, Ill.
Compasses, Engineers'	40	Good	Washington, D. C.
Crane, locomotive, 15-ton, 2.4 M. gauge	1	Good	Columbus, O.
Compressor, air, Ingersoll Rand, 14"x12" N-S B E	1	Good	Detroit, Mich.
Detonators, No. 8	60,000	Good	Benicia, Calif.
Detonators, No. 8	500,000	Good	Bricktown, N. J.
Derricks, stiffleg, 5-ton	10	Good	Pullman, Ill.
Derricks, stiffleg, 5-ton	2	Good	Kenningston, Ill.
Drills, air, Ingersoll Rand Electric Universal, 110 v-60 cycle	2	Poor	Hermitage, Tenn.
Drawing board with 2 angle pieces	1	Fair	Leaside, Ont., Canada
Engines, gas, 93-horsepower, 6-cylinder, Twin City 7"x9" mounted on steel truck, complete with tools	1	Fair	Norfolk, Va.
Engines, Clyde, 3-drum, steam hoisting, cyl. 9"x10", boiler, fittings and tools	3	Good	Columbus, Ohio
Engines, 3-drum, hoisting, 7"x11" cyl., American swinging	3	Good	Pullman, Ill.
Forges, portable	100	Good	Jeffersonville, Ind.
Hatchets	48	Good	Toledo, Ohio
Harness, double, with cable traces	556 sets	Good	Fort Mason, Calif.
Harness, cable trace, wheel	12 sets	Good	El Paso, Texas
Hoist, crab	3	Good	Norfolk, Va.
Hoist, chain, 1-ton	3	Fair	Detroit, Mich.
Hoist, chain, high speed, Cyclone, 1-ton	1	Fair	Toledo, Ohio
Iron, sheets, corrugated, 27"x120"	2,476	Poor	Columbus, Ohio
Lanterns, R. R., Adlake	312	Good	Jeffersonville, Ind.
Lanterns, folding, galvanized iron	192	Good	Jeffersonville, Ind.
Lanterns, Dietz	165	Good	Toledo, Ohio
Lanterns, R. R., Reliable	120	Good	Jeffersonville, Ind.
Levels	4	Good	Washington, D. C.
Lights, Carbic flare, No. 2 model	5	Good	Hermitage, Tenn.
Locomotives, steam, 24" gauge	2	Good	Portlock Yard, Va.
Mixer, concrete, 30 cubic feet with steam engine and boiler, Koehring No. 30	1	Fair	Newton, Ohio
Mixers, Milwaukee, size 14	2	Fair	Norfolk, Va.
Mixer, Oskosh, No. A537	1	Fair	Norfolk, Va.
Mixer, Rex, size 4-S	1	Fair	Norfolk, Va.
Mixer, Koehring, size 20	1	Fair	Hermitage, Tenn.
Motors, electric, 1½-horsepower, D. C.	1	Fair	Norfolk, Va.
Motors, electric, 5-horsepower, D. C. No. 2	3	Fair	Norfolk, Va.
Motors, electric, 4-horsepower, D. C. No. 3	1	Fair	Norfolk, Va.
Motors, electric, 3-horsepower, D. C. Nos. 4, 5, 6, 7	4	Fair	Norfolk, Va.
Motors, 50-horsepower, direct current	2	Poor	Norfolk, Va.
Motor vehicle spare parts—			
Light and heavy aviation trucks	3 crts.	Good	Camp Holabird, Md.
Buick, trucks	8 crts.	Fair	Camp Holabird, Md.
Commerce trucks	15 crts.	Good	Camp Holabird, Md.
Ford trucks	109 crts.	Good	Camp Normoyle, Tex.
Ford bodies, delivery type	13	Good	Columbus, Ohio
Ford trucks	1 lot	Good	San Pedro, Cal.
F.W.D. trucks	38 crts.	Fair	Chicago, Ill.
Nash Quad trucks	1 lot	Fair	Detroit, Mich.

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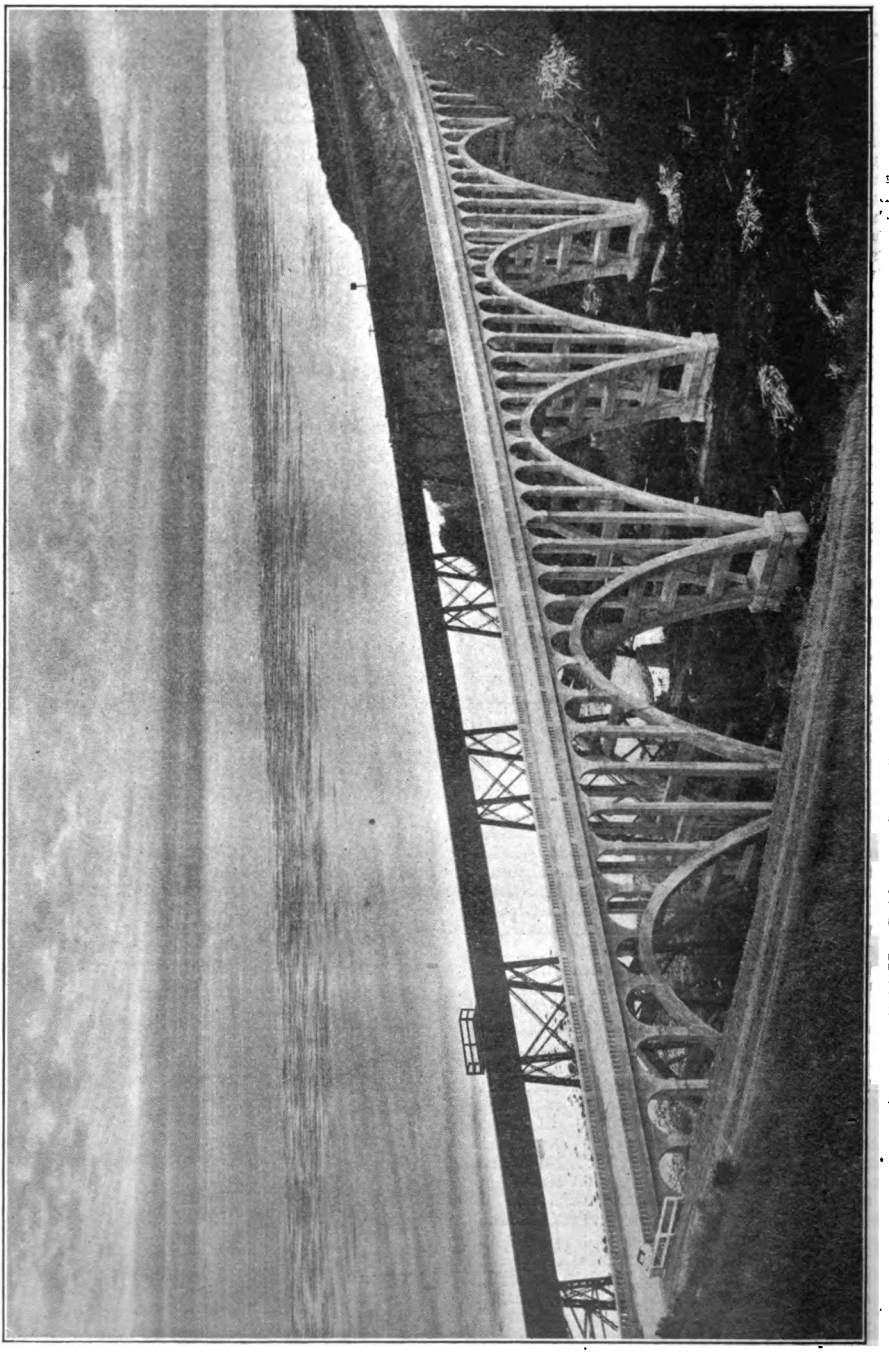


Plate XXXII. Bridge on State Highway, Santa Barbara County, over Arroyo Honda.

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MISCELLANEOUS EXCESS WAR MATERIALS RECEIVED FROM UNITED STATES GOVERNMENT—Continued.

Description	Quantity received	Condition	Shipped from
Motor vehicle spare parts—Continued.			
Nash Quad tops and curtains	8 sets	Good	Chicago, Ill.
Nash Quad trucks	3 lots	Fair	Kenosh, Wis.
Nash Quad trucks	2 lots	Fair	Ko Komo, Ind.
Nash Quad truck springs complete	126	Good	Toledo, Ohio
Packard trucks	1 lot	Fair	Camp Normoyle, Tex.
Packard trucks	1 lot	Fair	San Antonio, Tex.
Packard truck storm curtains	26	Good	San Antonio, Tex.
Peerless trucks	2 lots	Good	Camp Normoyle, Tex.
Pierce-Arrow trucks	1 list	Fair	Camp Kearney, Cal.
Pierce-Arrow trucks	1 list	Fair	Presidio, Cal.
Pierce-Arrow trucks	1 list	Fair	Presidio, Cal.
Republic trucks	1 list	Good	Presidio, Cal.
Studebaker trucks	1 list	Poor	Presidio, Cal.
Standard trucks	1 list	Poor	Buffalo, N. Y.
Truck bodies, steel, 9'6"x3'6"x3'0", ammunition type	44	Good	Charlotte, Mich.
Truck bodies, ammunition type	60	Good	Fort Bliss, Tex.
Tires	1 lot	Poor	Presidio, Cal.
Tires, various sizes	8	Poor	Mather Field, Cal.
Nails, 6d finishing (100-lb. keg)	13	Good	Augusta, Ga.
Pipe, 2" steel with fittings	6,000 feet	Good	Norfolk, Va.
Pipe, 4" galvanized with fittings	12,900 feet	Good	Norfolk, Va.
Post, fence, 6', angle iron	2,990	Good	New Cumberland, Pa.
Plow, rooter, with new point	1	Fair	Norfolk, Va.
Plow, tractor, 3-bottom, 14"	1	Good	New Cumberland, Pa.
Planimeters, Ainley, Polar	3	Good	
Pumps, Barnes, plunger, with 6-horsepower gas engine	1	Good	Columbus, Ohio
Pumps, steam, Tangyre, duplex	3	Fair	Norfolk, Va.
Pumps, Salmson, No. 2, centrifugal	1	No good	Brooklyn, N. Y.
Pumps, hand (Red Jacket)	60	Good	Columbus, Ohio
Pumps, hand piston, Ward Pump Co.	9	Good	Norfolk, Va.
Pumps, Gould, 4"x5" connected to 3-horsepower gas engine	9	Good	Pullman, Ill.
Pumps, Fairbanks Morse, connected to 3-horsepower gas engine and mounted on trucks	10	Good	Pullman, Ill.
Pumps, Hill, 4"x5" direct connected to 3-horsepower gas engine	5	Good	Pullman, Ill.
Pumps, centrifugal, Gould No. 3	8	Good	Frankfort, Pa.
Powder, army (cans)	2,000	----------	Nixon, N. Y.
Powder, T.N.T., grade 3	1,050,000 lbs.	----------	Sparta, Wis.
Powder, Trojan hand grenade	200,000 lbs.	----------	Sparta, Wis.
Powder, T.N.T.	338,450 lbs.	----------	Pig Point, Va.
Roller, Austin, road, 10-ton, gas	1	Good	Norfolk, Va.
Rope, Manila, ⅝"	1 coil	Fair	Augusta, Ga.
Sawing outfits, wood, portable	5	Good	Norfolk, Va.
Shelters, trench	10	Fair	New Cumberland, Pa.
Shovels, entrenching	60	Good	Camp Lewis, Wn.
Shovel, Marion steam, No. 31	1	Good	Jeffersonville, Ind.
Steel, hexagonal tool, 1"	90 feet	Good	Norfolk, Va.
Steel, hexagonal tool, ¾"	18½ feet	Good	Norfolk, Va.
Steel, hexagonal tool, ⅝"	652½ feet	Good	Norfolk, Va.
Tables, folding, 24"x36"	4	Good	Atlanta, Ga.
Tanks, 165-gal., galvanized steel	37	Good	Jeffersonville, Ind.
Tanks, galvanized steel, K.D., 480-gal.	5	Good	Kearney, N. J.
Transits, engineers'	3	Good	Presidio, Cal.
Tractors, 5-ton Cleveland	3	No good	Proving Ground, Ohio
Wagons, dump	4	Poor	Norfolk, Va.
Wagons, escort	46	Fair	Presidio, Cal.
Wagons, escort	14	Fair	American Lake, Wn.
Wagons, escort, parts	50 sets	Good	Jeffersonville, Ind.
Wagons, sprinkling, 450-gal.	7	Good	Jeffersonville, Ind.
Wheelbarrows	14	10 Fair / 4 Good	Anchor, Ohio
Winches, hand, 7" single drum	11	Fair	Columbus, Ohio

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DISPOSITION OF MOTOR VEHICLES RECEIVED FROM FEDERAL GOVERNMENT AS OF OCTOBER 1, 1920.

CARS	TYPE	UNDISTRIBUTED	DIV. I	DIV. II	DIV. III	DIV. IV	DIV. V	DIV. VI	DIV. VII	CITY	COUNTY	TOTAL
Aviation	Heavy-3 ton		10	4	4		2	4	4			28
Aviation	Light-1 ton	1	2	3	2	1	2	1	2			14
Buick	Touring		1		1	2	1					5
Commerce	3/4 ton		1	3		2	1		3			10
Federal	Dump-5 ton	1										1
Ford	Truck-1 ton				6				2			8
Ford	Truck-3/4 ton								1			1
Ford	Truck-1/2 ton				1							1
Ford	Light Delivery	2				2			1			5
Ford	Ambulance	4	4	3		1	2	4	2			20
Ford	Touring	4	1	1	13	4	4	2	6			35
Ford	Roadsters					3			2			5
Franklin	Touring				1							1
F. W. D.		17			17						2	36
G. M. C.	1½ ton								12			12
Hulburt	Dump-5 ton							1				1
International	2 ton	15		2			2	7			7	33
Kelly-Sp'field	3 ton	16									4	20
Locomobile	Dump-6 ton								2			2
Moreland	3/4 ton					1			1			2
Moreland	1 ton								1			1
Moreland	1½ ton										1	1
Moreland	2 ton										1	1
Moreland	2½ ton	8				1			1			10
Moreland	4 ton	3	1			2	1		2	1	24	34
Nash Quad	2 ton	44	4	18	37	9	10	15	32	1	48	218
Overland	Touring					1						1
Packard	1½ ton	2			1							3
Packard (used)	3 ton	12			1				11			24
Packard (new)	3 ton		7	8	14	8	4	10	12			63
Peerless	3 ton		5		6	6			6			23
Pierce Arrow	5 ton		2	4	9	4	4	7	10			40
Pierce Arrow	3 ton	2										2
Pierce Arrow	2 ton	7			1							8
Republic	3/4 ton					2						2
Service	Ambulance					1						1
Standard	3½ ton	4										4
Standard	2 ton	1										1
Studebaker	Touring	1		1		4						6
Studebaker	Roadster								1			1
Velie	3 ton	3										3
Velie	3½ ton	1										1
White	3 ton	4										4
Cleveland	Motorcycle	14		1	1		1		1			18
TOTALS		166	38	48	115	54	34	51	115	2	87	710
Value of Equipment		$297,101.00	104,066.00	120,449.00	290,313.00	113,838.00	80,864.00	139,992.00	291,756.00	4,311	187,561.00	1,630,250.00

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APPENDIX F.

BRIDGE WORK ON STATE HIGHWAYS.

By H. E. WARRINGTON, Assistant Highway Engineer.

A separate department was created on July 1, 1919, to handle the preparation and checking of plans and specifications for all proposed structures in connection with the work on the state highways, as the nature and volume of the work had become too extensive to be handled by the general office force. Mr. R. E. Dodge continued on as Bridge Engineer until the writer took charge on January 15, 1920.

During the last two fiscal years a number of important bridges have been completed, plans have been completed or are under way for many others, and considerable miscellaneous work has been undertaken, such as plans for the Headquarters Maintenance Shop in Sacramento, small buildings, maintenance sheds, truck shelters, etc., a brief statement of the features of the more important projects being given later herein.

Most of the large bridges on the state highways are built or paid for by the counties in which they are located. The plans for these bridges are either made or checked by this department, and the actual construction is done either by the counties or the state, as the counties elect—in any case, however, after their completion and acceptance, the bridge becomes a part of the state highway system and is maintained by the Commission.

The First Biennial Report of the California Highway Commission, Appendix L, outlines the general policy of the California Highway Commission in respect to bridges.

Further experience with the methods of design and construction of bridges by counties has served to confirm the previous recommendation that legal authority should be granted to the Commission to enforce proper standards and compel inspection by qualified inspectors, and, if necessary, to condemn unsafe structures and require their renewal, and it is again urged that such authority be asked of the next Legislature.

The temptation to build the cheapest bridge, regardless of its adequacy, is too great to be resisted in many instances, and while it is true in most cases that the county authorities desire to construct substantial structures only, their lack of knowledge as to what is proper has resulted in the erection of inferior bridges which are unable to stand the heavier traffic for any length of time. Several such now exist on the state highways, and renewals, or extensive repairs amounting substantially to renewal, will soon be necessary.

The requirements of the Commission as to bridges, outlined in its vote of September, 1912, are not sufficient to secure what is desired, and as noted in the former report, inconsistencies and difficulties have been encountered in interpreting them.

The need of standard general specifications covering the design, manufacture and erection of structures, to which all bridges built upon the state highway must conform, is quite obvious. Such specifications covering modern requirements have been prepared and used in

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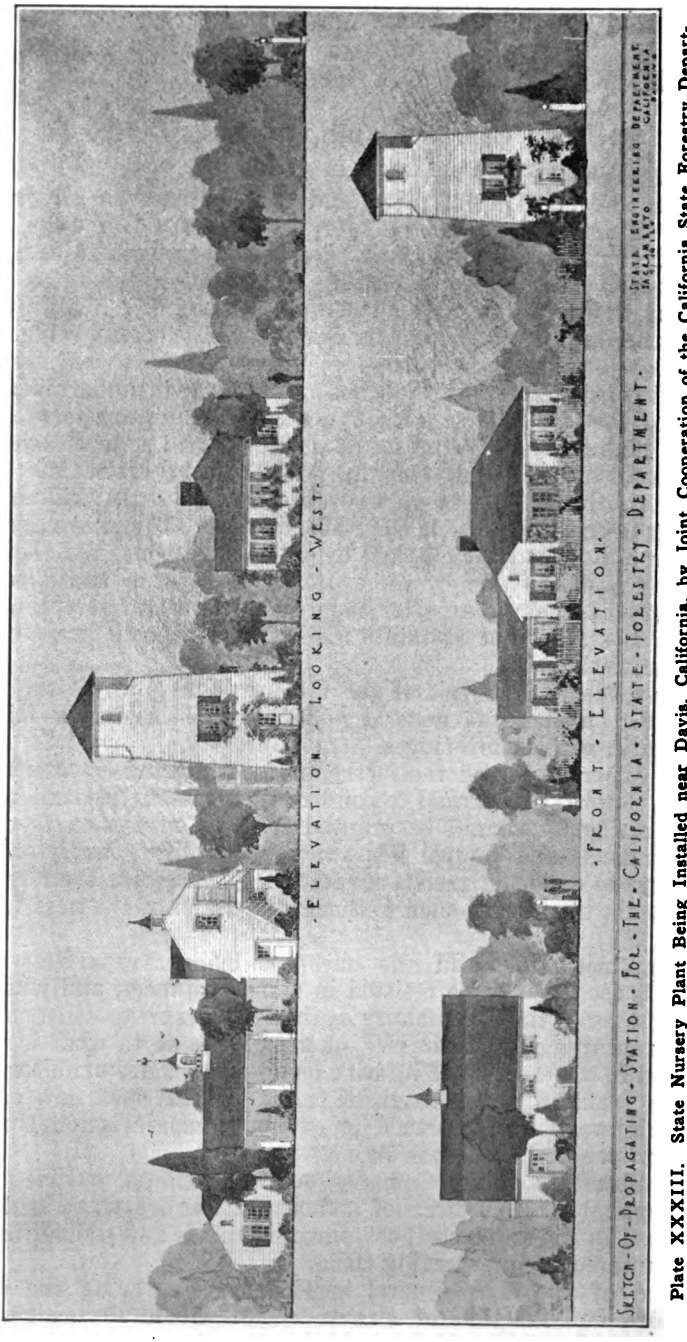


Plate XXXIII. State Nursery Plant Being Installed near Davis, California, by Joint Cooperation of the California State Forestry Department and the California Highway Commission, for the Production of Trees to be Planted Along Highways of California.

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our designs, but the lack of authority to insist upon their use by others should be remedied. There will always be differences of opinion on such a large subject as bridge design, but the main features and general details have been well settled by past experience, and conservative practice should be followed to secure the best results. Bridges upon the state highways, being built by or under governmental authority, are regarded as models to be followed by others, and whether they be good or bad, their influence upon other construction is great, and is worthy of grave consideration.

It is probable that most of the unsatisfactory work done has been due to lack of specific requirements and ignorance of just what is demanded in state work. Accordingly, the specifications above mentioned have been made, purposely, very full as regards details, and structures built under them will conform with present demands to a much greater extent than heretofore.

More particularly as regards concrete structures, their design, except in the case of arches, is apparently so simple that many persons not qualified by experience or knowledge in that particular field have attempted it, forgetting that many considerations exist due to its more or less monolithic action requiring most careful analysis.

As has been well said, "Poor materials are shown up in a comparatively short time, but inadequacy of design is more likely to be responsible for defects which do not develop until years after construction."

Bridges of first class design and workmanship have a higher first cost, but this added expense is more than repaid in their lessened maintenance and longer life. The railroads have long since learned this lesson, and it is only a question of time until it will be forced upon the highway officials of the country by costly experience, if in no other way.

Bridges Designed by the Commission and Completed During Last Two Years.

The Eureka Slough bridge, in Humboldt County, is interesting because of the use of a wooden lift span, made necessary on account of the lumber traffic on the slough. The total length of the bridge is 712 feet, made up of an east approach of sixteen 30-foot reinforced concrete girder spans on reinforced concrete piles; the lift span above mentioned, 75 feet long, on concrete piers, with wood towers, and with creosoted pile fenders and dolphins; and a west approach of the same type as the eastern one, but of only four spans of 30 feet. The roadway is 21 feet wide, and the entire bridge is built over a salt marsh.

The Cottonwood Creek bridge, in Shasta County, consists of nine 60-foot reinforced concrete earth filled arches founded upon piles (Plate XIII), the total length being 540 feet. The roadway width is the standard 21 feet. A contract was let for the construction of this bridge but the contractor failed and the Commission completed the work by day labor.

The bridge over the Salinas River, near King City, in Monterey County, is well along towards completion and should be entirely finished before the end of this year. The Salinas River is a dry wash for most of the year but a wide, swift stream during floods. Its bed consists largely of sand, with some fine gravel, and the banks are very easily eroded. Considerable depths of foundations are necessary to prevent

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loss from scour of the river bed, and a long bridge is required. Over the main channel are built fourteen 100-foot steel truss spans on concrete piers founded upon wood piles. The south approach is a long concrete trestle of thirty-nine 30-foot reinforced concrete girder spans with reinforced concrete pile bents, and the north approach, of the same type, is sixty feet long of two 30-foot spans, also upon concrete piles. (See Plate VI.) The total length of the bridge is slightly over one-half mile (2653 feet).

Bank protection was necessary on the north side, and a pile and plank structure some 2200 feet long was placed above the bridge and for a short distance below, where it connects with existing protection.

The Arroyo Honda bridge in Santa Barbara County is a reinforced concrete arch structure, and has five arches, one of 78 feet span, three of 96 feet span and one of 85 feet span. All the arches have high rise, the two shorter arches being unsymmetrical, as good foundation material was encountered high upon the banks. In addition to the arch spans there are short concrete approaches at each end, on reinforced concrete columns. (Plate XXXII.) The total length of the structure is 528 feet.

Bridge Plans Completed or Under Way.

In addition to the above work, plans have been completed or are well under way for a number of important bridges, among which may be mentioned the following:

The Bear Creek Bridge, in Humboldt County, which is an open spandrel reinforced concrete arch span of 128 feet with reinforced concrete approach spans on concrete columns. The arch spans a deep and narrow gorge.

In Butte County, plans for the bridge across Feather River are in progress.

In Nevada and Yuba counties plans have been completed for the bridges over the South and Middle Fork of the Yuba River—both being reinforced concrete arches. Construction by state forces will soon begin on the Middle Fork bridge, and it is hoped to complete it before the end of the year.

The plans are under way for an arch bridge over the Susan River in Lassen County.

Plans have also been completed for several other bridges in various parts of the state, and are awaiting construction, and many shorter bridges have been constructed.

Overhead and Subway Crossings.

The overhead crossing of the Sacramento Northern Railroad, on the Oroville lateral, has been completed since the last report. Plans for the overhead crossing of the Nevada County Narrow Gauge Railway near Town Talk have been completed. The crossing under the Southern Pacific near Red Bluff will very shortly be let by contract, eliminating a bad grade crossing, and the work is expected to be finished by the end of this year, or shortly thereafter.

In San Diego County the overhead crossing of the San Diego and Arizona Railway has been taken in hand, the plans completed, and the matter is now before the Railroad Commission.

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Negotiations are under way for the proposed undergrade crossings of the Southern Pacific Railway near Fredonia, in Lassen County, and of the Northwestern Pacific Railroad near Arnold in Mendocino County, and these will very shortly be taken up with the Railroad Commission.

Surveys have been received and studies are now being made of the overhead crossing of the Southern Pacific at Sheridan, in Placer County, of the undergrade crossings of the Southern Pacific near Redding in Shasta County, and near Brighton in Sacramento County.

The Southern Pacific Company and the county of Alameda are about to proceed with the construction of the overhead crossing east of Altamont, and together with the California Highway Commission will jointly construct the overhead crossing west of Altamont early in 1921.

Headquarters Maintenance Shop.

Plans for the proposed Headquarters Maintenance Shop in Sacramento are in progress. This shop will be of steel and brick construction, and will be located on the east side of Thirty-fourth street, opposite the present Division III maintenance shops on land purchased by the Commission for the purpose. The buildings will cover an area of about six-tenths of an acre, and will include a machine shop, blacksmith shop, automobile and truck repair shops and store room. An office building is included for the superintendent, with accommodations for stenographers and clerks. The building will be well ventilated by monitors, and practically the entire sides are of glass in steel sash, affording abundant light. An electric traveling crane of fifteen tons capacity is to be added in the future. The machine shop is provided with a monorail traveling hoist of three tons capacity, for handling the heavier parts of engines, castings, etc. A railroad siding will extend into the ground from the Southern Pacific tracks, and a locomotive steam crane will take care of loading and unloading of cars. Modern lockers, lavatories, and shower baths are to be provided for the workmen.

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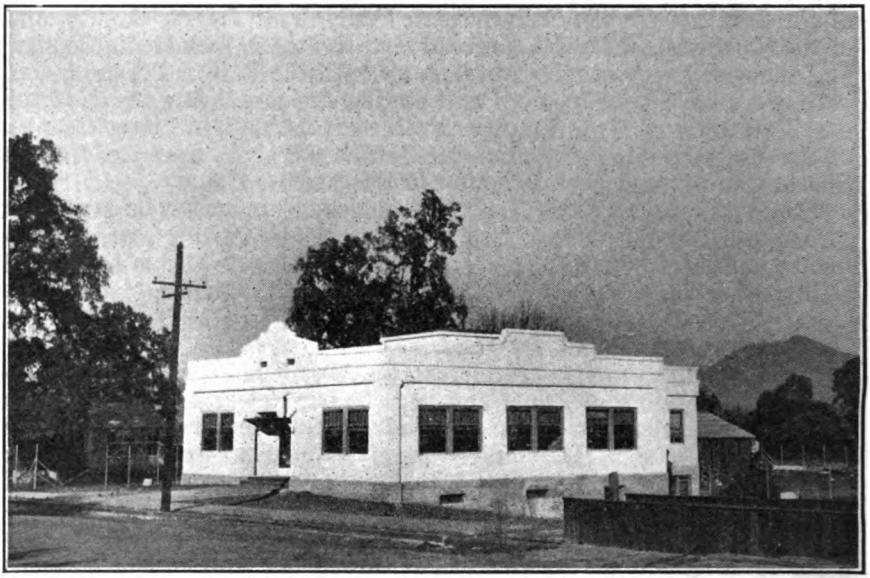


Plate XXXIV. State Highway, Division Office Building, Willits, Mendocino County, California.

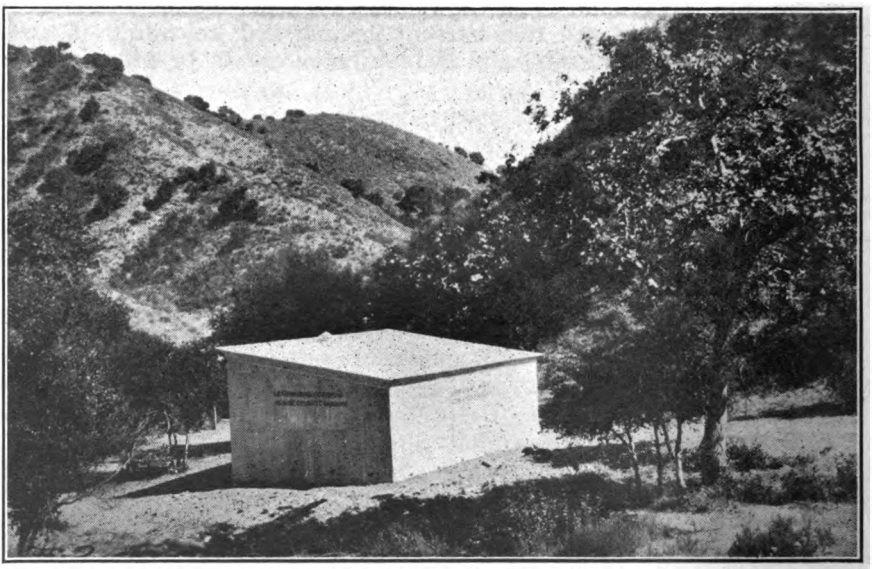


Plate XXXV. Powder Magazine, San Luis Obispo County.

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APPENDIX G.

TESTING DEPARTMENT.

By F. T. MADDOCKS, Testing Engineer.

The laboratory work for the California Highway Commission was begun in May, 1912, under the supervision of the then Geologist, Mr. C. B. Osborne, who resigned from the service October 17, 1918. The present force consists of the Testing Engineer and two assistants.

The Testing Laboratory occupies a very important place in the construction of highways. The permanence of the various types of pavements depends as much upon the proper selection and uniformity of the aggregates used as upon proper workmanship.

In addition to the regular routine tests made in the laboratory much experimental work is also required. While many of the tests have been standardized by the various technical societies, there are several very vital ones still in the formative period.

As Testing Engineer of this Commission, it was the writer's pleasure to attend a conference of Testing Engineers of the various state highway departments, held in Washington, D. C., the week of February 23, 1920. The conference was called by the American Association of State Highway officials for the purpose of adopting standard methods of conducting tests on materials used in highway construction and for setting proper test limits on these materials.

As a result of this conference special committees were appointed to cooperate and report at the next convention. These committees were:

Committee for Abrasive Test for Gravel.

Committee for Test for Shale in Fine Aggregate.

Committee for Studies for New Tests on Cement.

Committee for Toughness and Adhesive Tests on Bituminous Materials.

The California Highway Commission Testing Department, together with those of the Bureau of Public Roads, New York, Illinois, Pennsylvania, Iowa and New Jersey, was placed on the last named committee.

To standardize test limits, the different states were grouped into districts. In each district a representative was appointed to call together the proper officials in his district for the purpose of deciding upon proper test limits for materials used in that group of states. The writer was appointed representative of the group comprising Washington, Oregon and California.

Concrete and Concrete Aggregates.

As the concrete base road is the standard type of pavement built by the Commission, more tests are made of the materials entering into its fabrication than any other type.

Due to the ever-increasing loads that a concrete pavement has to sustain, it is apparent that a very close watch must be kept upon its various constituents. It is probable that no one factor influences the strength of concrete more than the sand used. It composes about one-third of the volume of concrete and is made up of millions of small

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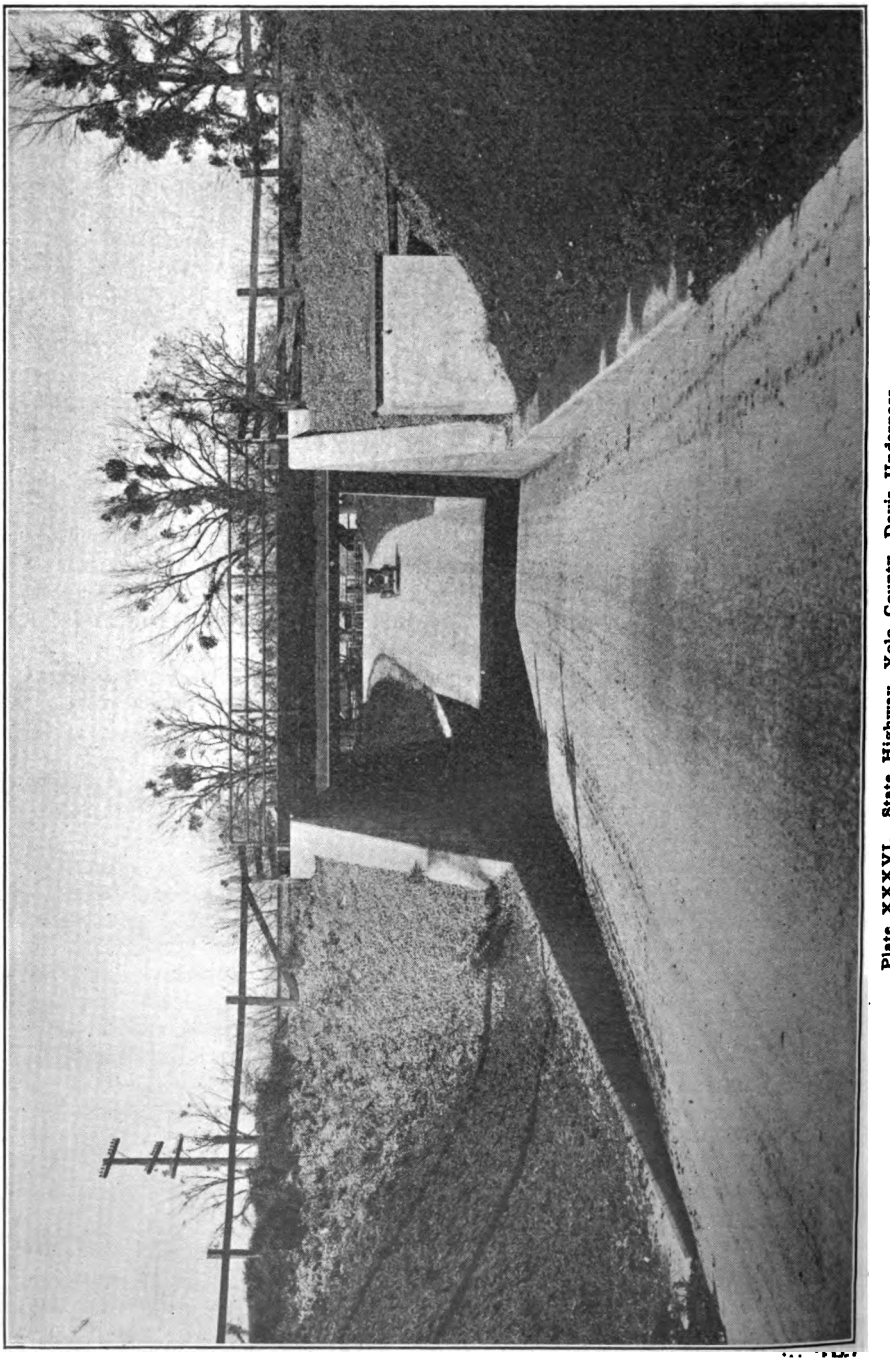


Plate XXXVI. State Highway, Yolo County, Davis Underpass.

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particles, each of which must be coated with cement. To properly perform their function in a concrete mixture, the sand grains must be clean, structurally strong, and graded so as to make as dense a mixture as possible.

The rock portion of the aggregate must also be clean and sufficiently strong. The surfaces must be of such a nature as to allow the cement mortar to adhere to them.

Cement is sampled in bin lots by a representative of the Commission and is not released until it passes the standard requirements of the American Society for Testing Materials. In addition to the laboratory tests, field tests are made to determine the constancy of volume and setting time.

Before a contract is started all materials proposed for use are sampled and submitted to the laboratory for concrete tests. Where several sources of the same kind of aggregate are available, tests are made to determine the relative value of each. In well established pits, where the products are uniform, average samples only are tested; where not uniform, samples of the various grades are tested. Check tests are conducted at frequent intervals during the progress of the work.

While the physical tests made on the sand and rock samples separately are of great value, experience has shown that the proper method of acceptance is based upon the compressive strength of these aggregates combined in concrete. In the laboratory, test specimens are molded in the same proportions and of the same aggregates as used, or proposed to be used, in the field. These are kept moist for a period of 28 days. The average compressive strength of laboratory concrete at the end of this period is 2200 pounds per square inch.

A study of the strength of concrete in the finished pavement has been made by means of cores removed from the pavement by a Calyx core drilling outfit.

Surface Mixtures.

Perhaps the success of no other type of pavement is so dependent upon careful tests as the asphaltic surface type. Frequent daily tests are made to determine the amounts of the different ingredients entering into the admixture and the character of these ingredients. In these mixtures, as in concrete ones, the fine mineral aggregate plays a most important part. To prevent internal movement, the sand must contain the proper amounts of both fine and coarse grains in order to reduce the size of the voids between them to a minimum. Only sufficient asphaltic cement should be added to fill these voids and coat the mineral aggregate.

Density tests are made on samples taken each day from the finished pavement to determine the amount of compaction received under the roller.

The physical properties of a road oil furnish more information regarding its suitability for use in the construction of the thin bituminous wearing surface than do the chemical ones. The cementing and viscosity properties are the two most important ones to be considered.

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Summary of Regular Tests Made in the Laboratory—May, 1912 to September, 1920.

Sand: 985 samples tested for—
- Weight per cubic foot.
- Compressive strength of 1-3 mortar at 7 and 28 days.
- Grading.

Gravel: 357 samples tested for—
- Weight per cubic foot.
- Compressive strength in concrete.
- Grading.

Rock: 270 samples tested for—
- Specific gravity.
- Absorption.
- Abrasion—Deval test.

Concrete: 1796 samples tested for—
- Density.
- Compressive strength at 28 days.

Cement: 4000 samples tested for—
- Specific gravity.
- Fineness.
- Setting time.
- Constancy of volume.
- Tensile strength of 1-3 mortar.

Asphaltic surface mixtures: 1004 samples tested for—
- Density.
- Amount of bitumen.
- Amount of mineral aggregate.
- Grading of mineral aggregate.
- Consistency of asphaltic cement.

Asphaltic cement: 600 samples tested for—
- Penetration.
- Volatilization at 325 Fahrenheit.
- Penetration of residue after volatilization at 325 Fahrenheit.
- Solubility in carbon bisulphide, tetrachloride, and naptha.
- Fixed carbon.

Road oil: 1100 samples tested for—
- Water and sediment.
- Solubility in carbon bisulphide and tetrachloride.
- Flash and burning point.
- Viscosity.
- Adhesiveness.
- Loss at 325 Fahrenheit.
- Asphaltic contents.

Corrugated metal pipe: 130 samples tested for—
- Amount of spelter per square foot.

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APPENDIX H.

THE PURCHASING DEPARTMENT.

By LOWELL R. SMITH, Purchasing Agent.

The personnel of this department has changed somewhat since the issuance of the last biennial report. Mr. R. C. Penter, Purchasing Agent for the Commission at the time the last report was issued, died December 28, 1918. The writer was appointed as his successor on January 20, 1919, and on March 1, 1920, Mr. C. E. Thorp was appointed Assistant Purchasing Agent.

Almost continuously during the past two years goods have been bought on a rising market, but by anticipating increasing prices on many commodities, considerable savings have been effected. To illustrate, on December 15, 1919, a carload of sugar was purchased from one of the western refineries at a price of $9 per hundredweight. Shortly thereafter, the price of sugar advanced to $24 per hundredweight. Considerable saving was also made in the purchase of lubricating oils, greases, etc., by having these commodities placed on a contract basis. This contract was made August 14, 1919, to extend over one year to August 14, 1920. During the life of this contract 1000 barrels of lubricating oil were purchased. The contract was placed on the basis of prices being paid by the Commission prior to August 14, 1919, less three cents per gallon to be rebated to the Commission on all oils so purchased. This rebate, together with the fact that the state was protected from an increase of five cents per gallon made on lubricating oils in April, 1920, effected a net saving on this item alone of approximately $1,800.

With the advance in prices on many commodities, there has been a corresponding scarcity of such commodities, at one time it being almost impossible to purchase such an item as nails in any quantity. This condition, somewhat relieved at present, is still very noticeable. Inability to obtain equipment and materials promptly has, of course, been a serious handicap to the work, and often substitutions were made, and in many cases transfers from one division to another were possible. In anticipation of shortages of the commodities most used in highway construction, during the early spring of this year, purchases of some 1500 tons of reinforcing steel were made, and because of this foresight, no appreciable delay can be charged to the lack of reinforcing steel.

The western stock of road machinery—as well as repair parts therefor—has also been sadly depleted during the past two years. To reduce delays in day labor work on this account to the smallest degree, the Commission, on March 5, 1920, appropriated the sum of $50,000 from the State Highway Fund for the purpose of purchasing, from time to time, such concrete mixers, rock crushers, road rollers and other equipment, new or second-hand, as might become available. This action was taken, as it was evident at that time that there was, and would continue to be for some months, a serious shortage of such equipment. The receipt of much needed machinery from the surplus

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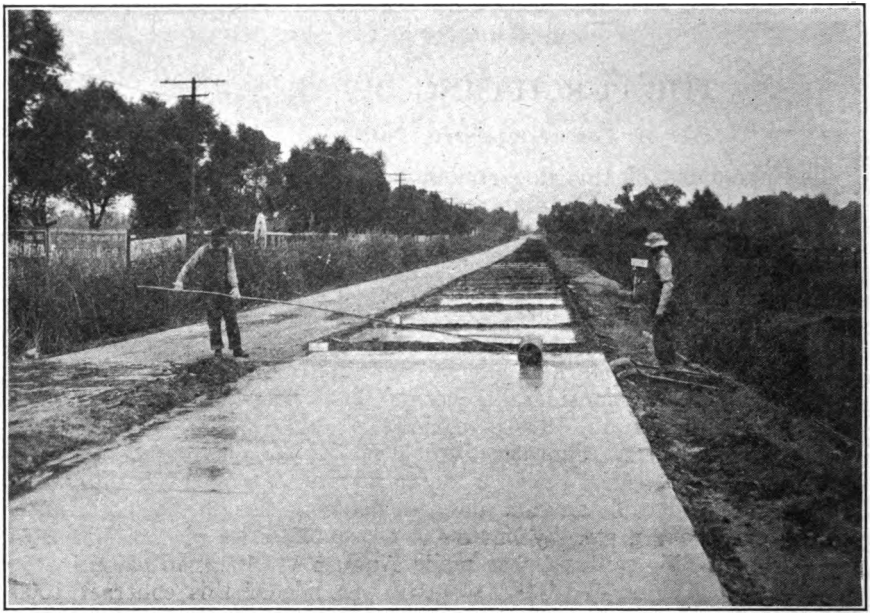


Plate XXXVII. State Highway, Kern County, near Bakersfield. Constructing Half Width of Base to Allow Passage of Traffic.



Plate XXXVIII. State Highway, San Mateo County, near San Francisco.

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military equipment furnished this state by the United States government helped also.

Mention is made here of surplus military equipment received from the government in so far as this department has been concerned in the handling thereof. Among other items this Commission received from that source, 1,500,000 pounds of trinitrotoluol, 200,000 pounds of hand grenade powder, and 50,000 pounds of black blasting powder, or a total of 35 carloads. This powder was all received in bulk, and arrangements were made to punch all the hand grenade and 700,000 pounds of the trinitrotoluol into cartridges, after which it was reshipped to various magazines constructed by the state for this purpose. The remainder of the trinitrotoluol was diverted enroute to the various magazines, in bulk. Nine of these magazines were constructed, one each at the following points: Luffenholtz, Redding, Fairoaks, San Luis Obispo, Bakersfield, Jacumba, El Portal, Yreka and Korbel.

Other surplus military equipment received from the government has been placed in headquarters stock, principally at Sacramento and Los Angeles. Weekly lists are issued from the headquarters office showing the equipment available for distribution to the various divisions, and from such lists, the Division Engineers make requisitions to the headquarters office for such of the equipment as they are in need of. An endeavor is made at all times to obviate the purchase of any articles which might be supplied from this surplus military equipment.

On August 5, 1918, as was noted in the last biennial report, all the special freight rates throughout the United States were abolished and it was necessary for the Commission to pay full tariff rates on all shipments. This condition existed to May 1, 1919, when a special reduction of ten cents per ton on rock, gravel and sand was extended to state, county, township and municipal governments. This reduction was enjoyed by the Commission to February 29, 1920, when it was abolished by virtue of the railroads going back to private ownership. Since that time the Commission has been paying full tariff rates on all commodities, and on August 26, 1920, an additional increase in freight rates of 25 per cent was allowed the railway companies of this state.

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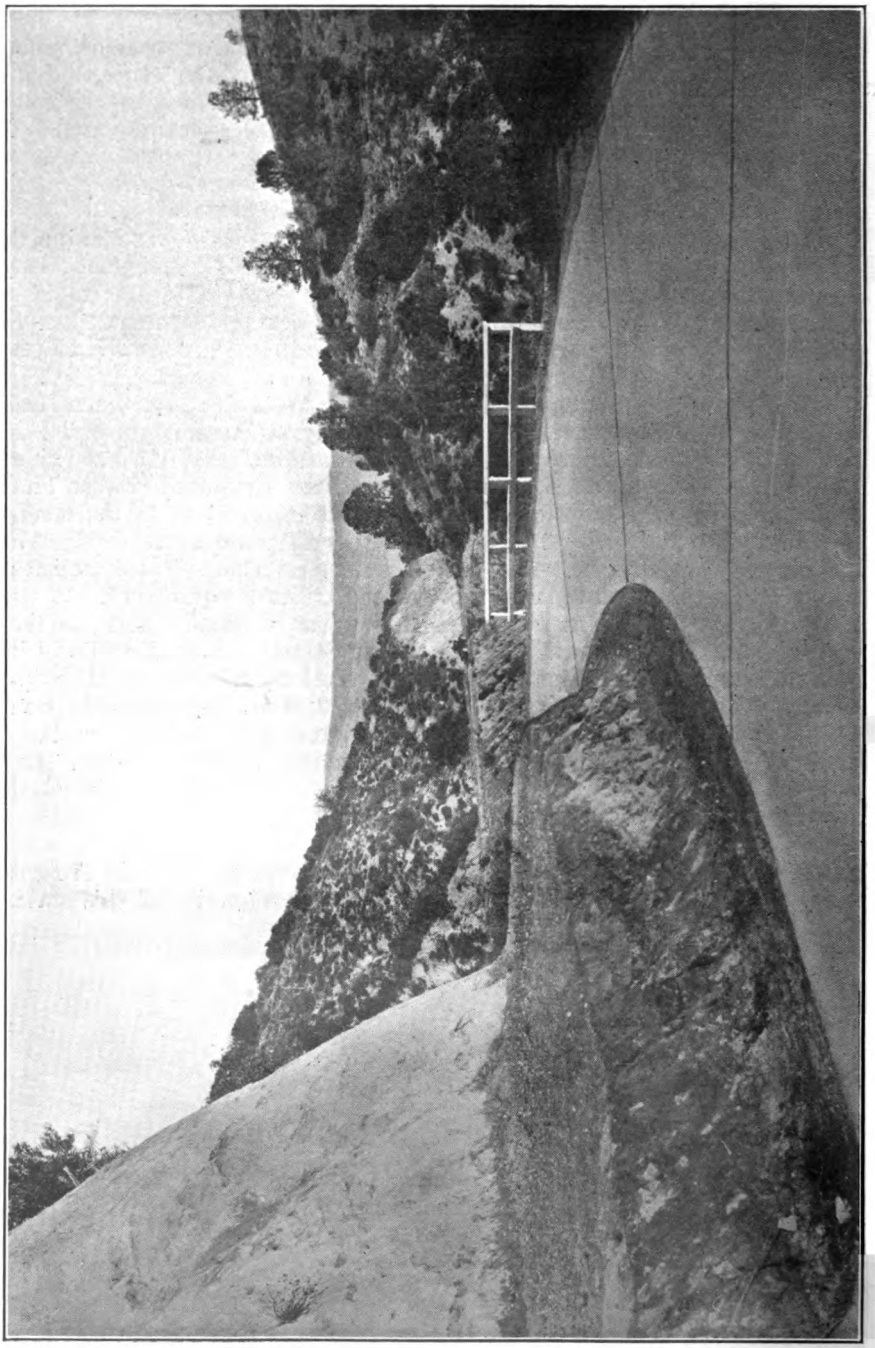


Plate XXXIX. State Highway, Los Angeles County, on the Ridge Route, Showing Day-Lighting of Slopes on Curves

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As a comparison of freight rates paid by the Commission prior to August 5, 1918, and present rates being paid, the following is of interest:

Commodity: From	To	Old rate per ton	Present rate per ton
Cement—			
Tolenas	Woodland	$0 75	$1 80
Colton	Camarillo	2 70	4 30
Davenport	San Luis Obispo	2 05	4 60
Riverside Junction	Oceanside	2 00	3 00
Victorville	Oceanside	2 30	3 40
Oro Grande	Montalvo	3 00	4 90
Rock—			
Fairoaks	Woodland	20	60
Coyote	Glenwood	17	60
Niles	Altamont	13	60
Logan	Paso Robles	61½	1 10
Crushton	Camarillo	38	1 30
Friant	Merced	39½	1 00
Sand—			
Marysville	Zamora	25	90
Niles	San Mateo	23	66
Riverbank	Stockton	12½	60
Antioch	Lodi	30½	1 00
Piedra	Delano	45	1 20
Roche	Pixley	25	80
Asphalt—			
Richmond	Red Bluff	1 83	4 80
Oleum	Fresno	1 79	5 00
Road oil—			
Roadamite	San Jose	2 10	3 60

While an exhaustive study of the increased freight rates cannot be made without a very extensive tabulation, the above instances are typical of the increases, and it is safe to say that the total average advance in freight costs on all shipments is at least 300 per cent above the pre war charges.

As previously stated, one of the important duties of this department is the supervision of the freight movements of the goods purchased. During the year 1919 the usual difficulties resulting from the shortage of freight cars were encountered, but this shortage has not been so noticeable during the present year, principally on account of the fact that the Commission's requirements for road materials such as cement, rock, sand, gravel, etc., have been considerably under normal.

While many delays were experienced during the present year because of the lack of such road materials as are mentioned above, and particularly cement, the trouble was chargeable, almost without exception, to the vendors. The cement companies have been unable to make shipments promptly because of labor troubles and power shortage.

Had the Commission carried on its operations during the present year on a scale equal to that of previous years, these delays would have been extremely serious, and even with the curtailed operations of this year, at no time has the cement been received as regularly as required, and in many cases the delivery of rock, sand and gravel has been delayed.

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The same condition exists at the present time and it is hoped this situation will have been cleared up by the building material firms before heavy work is resumed.

Appended to this report is a detailed statement of cement purchases made by the Commission from 1918 to June 30, 1920. For details of cement purchases to June 30, 1918, see First Biennial Report, Appendix N. At the close of the year 1918 the mill base price of cement was $1.95. Beginning early in the spring of 1919, the mill base price of this commodity was raised to $2.10, and from time to time the companies have made further advances until now the general mill base price is $2.70.

Below is given a recapitulation of all cement purchased by the California Highway Commission from 1912 to June 30, 1920, showing that the average mill base price paid for cement during that period was $1.447:

Year	Total deliveries (barrels)	Total cost at mill	Average mill base per barrel
1912	142,465.50	$176,683 24	$1 240
1913	242,514.50	317,376 36	1 309
1914	677,790.25	898,403 48	1 325
1915	355,005.50	485,267 31	1 367
1916	110,090.00	150,958 28	1 371
1917	220,794.00	321,064 61	1 454
1918	221,418.00	359,036 76	1 621
1919	241,581.00	464,842 77	1 922
1920	43,048.00	89,699 56	2 083
	2,254,706.75	$3,262,832 37	$1 447

In conclusion it may be said the records of few departments will show a greater range of commodities purchased. On contract work, this department purchases all road material, such as cement, rock, sand, gravel, culvert pipe and reinforcing steel. In connection with day labor work, and particularly that in the convict labor camps, a wide diversity of wants are met, embracing in the case of free labor camps not only the materials of construction, but food supplies, tools, road machinery, hay and grain, camping outfits, gasoline, oils and greases, and all other supplies necessary for carrying on such work. In the case of convict labor camps, in addition to the above, clothing, medicines, barber supplies, tobacco and snuff are but a few of the many purchases made.

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APPENDIX I.

THE ACCOUNTING DEPARTMENT AND FINANCIAL STATEMENT.

By H. B. WEAVER, Chief Accountant.

The activities of the Accounting Department have increased greatly during the two years since the last biennial report due in part to the normal growth of the state highway maintenance work, but more, perhaps, to the larger number of day labor projects undertaken in recent years by the Commission.

Since July, 1919, the Commission has received from the United States government a large amount of surplus war material, including seven hundred or more trucks and automobiles and a considerable amount of other supplies. The accounting for this material has made much extra work for this department.

The Federal Aid highway procedure has also added to the accounting burden. During the biennium vouchers requesting Federal Aid, amounting to over a million dollars have been filed with the United States Bureau of Public Roads, and to support these vouchers it was necessary to render statements, in great detail covering expenditures amounting to considerably over twice that amount.

Previous to the beginning of the present fiscal year, the analysis of the maintenance charges was made by the Engineering Department at the end of stated periods, but at the end of the 1920 fiscal year a system was installed under which the analysis of these charges is to be handled on a current basis, the work to be done by the Accounting Department.

As shown in the last report the accounting department was then auditing and handling about 3000 claims monthly. During the fore part of the year 1920 approximately 4500 claims per month exclusive of pay rolls were being so handled each month.

The following table shows the expenditures for state highways, including their maintenance, by years since the beginning of the work in 1912.

Withdrawals From the State Treasury by the California Highway Commission.

	Total amount for year	Monthly average
1912	$556,768 00	$55,677 00
1913	2,032,079 00	169,339 00
1914	4,415,933 00	367,994 00
1915	8,320,164 00	693,347 00
1916	4,366 827 00	363,902 00
1917	3,306,721 00	275,560 00
1918	6,410,132 00	534,178 00
1919	7,060,667 00	588,389 00
1920 (first six months)	[1] 4,432,614 00	[1] 738,769 00

It has become increasingly difficult to secure competent clerks and accountants chiefly because of the relatively low salaries which the state wage scale permits. Private concerns seem to be able to offer more attractive salaries for this class of employee than the state can.

[1]Owing to lack of funds, bills amounting to about $400,000 were unpaid on June 30, 1920. Had money been available the monthly average for the first six months of 1920 would have been $805,436.

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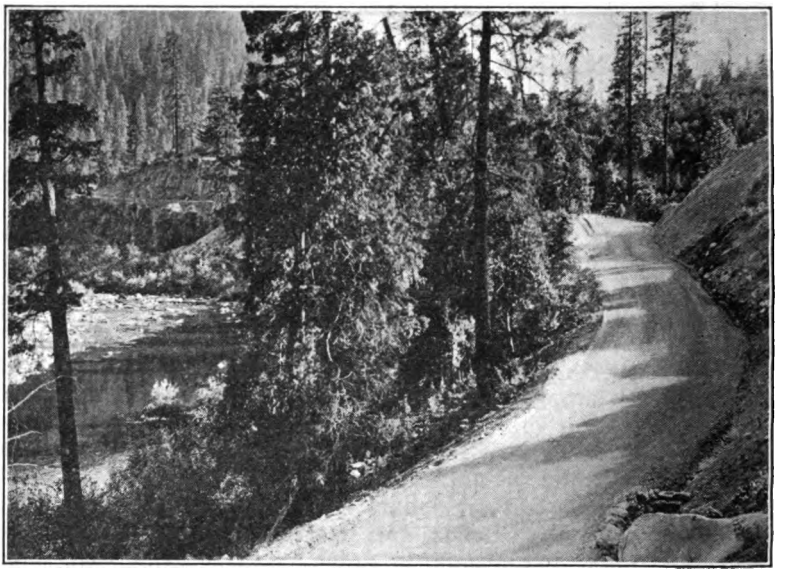


Plate XL. State Highway, Shasta County, near Hazel Creek



Plate XLI. State Highway, Shasta County, near Baird.

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The State Highway Acts of 1909 and 1915 (as stated in the first biennial report) and also the State Highway Act of 1919, provided that interest on the state highway bonds should be paid by the counties, in proportion to the amounts spent in the various counties. Therefore, all charges that can be, are segregated by counties and the general expense is later distributed in proportion to the amounts so charged. A detail of charges to the various counties will be found on pages 99–102 of this report.

For the First State Highway Fund the total amount of expenditures has been segregated by counties; for the Second and Third State Highway Funds, only the direct charges have been thus segregated. The general expense will be distributed as soon as the total amount of either fund has been expended.

In Appendix R will be found a full statement of the expenditures for maintenance covering the period 1912 to July 1, 1920 together with a complete analysis of such expenditures.

A full explanation of the accounting system, including a list of the accounts, is included as "Appendix H" of the first biennial report, of this Commission. This system remains unchanged in any essential particular.

STATEMENT OF CONDITION.

June 30, 1920.

(RECAPITULATION)

ASSETS.

	First State Highway Fund expenditures	$18,002,129 00
	Second State Highway Fund expenditures	13,753,743 66
	Third State Highway Fund expenditures	3,242,923 85
	Motor Vehicle Fund expenditures	5,780,550 92
	Special appropriation expenditures	97,683 99
	Expenditures, contributions by counties, cities and federal aid	691,692 49
	Discount on Third State Highway bonds	222,160 50
	Cash on hand	138,012 65
	Funds in treasury	980,338 32
	Total assets	$42,909,235 38

LIABILITIES.

55	Vouchers payable	$747,960 64
57	First State Highway bonds	18,000,000 00
58A	Donations	632,120 73
60	Unclaimed wages (State Highway Fund)	3,230 51
60A	Unclaimed wages (Motor Vehicle Fund)	714 16
62	Motor Vehicle Fund apportionments	6,539,563 21
64	General appropriations, chapter 704, Acts 1915	7,321 86
65	General appropriations, chapter 708, Acts 1915	7,986 50
66	Premiums (First State Highway bonds)	2,129 00
67	Federal Aid road account	568,183 77
68	Appropriation, chapter 746, Acts 1917	250,000 00
69	Second State Highway bonds	13,000,000 00
70	Premiums (Second State Highway bonds)	25 00
73	Revolving Fund Reserve (First State Highway Fund)	100,000 00
74	Revolving Fund Reserve (Second State Highway Fund)	50,000 00
75	Third State Highway bonds	3,000,000 00
	Total liabilities	$42,909,235 38

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Plate XLII. State Highway, Los Angeles County, on the Ridge Route.

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STATEMENT OF CONDITION.

June 30, 1920.

(DETAILS)

ASSETS.

First State Highway Fund expenditures:			
2 Highways in process			$16,308,250 14
5 Sand plants			20,474 64
20 Construction equipment	$18,255 04		
21 Engineering equipment	18,914 43		
22 Furniture and fixtures	17,038 04		
23 Stable equipment	12,477 54		
24 Automobile equipment	40,839 04		
25 Camp equipment	4,744 67		
26 Laboratory equipment	2,847 42		
Total equipment			115,117 08
35 Store account			21,174 76
43 Headquarters expense	$272,101 01		
44 Divisions expense	372,381 08		
72 County expense	892,630 29		
Total expense			1,537,112 38
Total State Highway Fund (first) expenditures			$18,002,129 00
Second State Highway Fund expenditures:			
2 Highways in process			$12,162,098 69
5 Sand plants			14,602 91
10 Maintenance yards			36,507 45
11 Powder magazines			10,526 26
20 Construction equipment	$74,777 40		
21 Engineering equipment	20,870 82		
22 Furniture and fixtures	17,438 04		
23 Stable equipment	5,211 75		
24 Auto equipment	154,093 56		
25 Camp equipment	14,180 44		
26 Laboratory equipment	2,498 93		
28 Shop equipment	113 84		
Total equipment			289,184 78
35 Store account			6,345 18
43 Headquarters expense	$242,907 25		
44 Divisions expense	447,672 29		
72 County expense	473,158 30		
245 County expense (new routes)	109 78		
Total expense			1,163,847 62
71 Motor Vehicle Fund charges on State Highway Fund schedules			70,630 77
Total Second Highway Fund expenditures			$13,753,743 66

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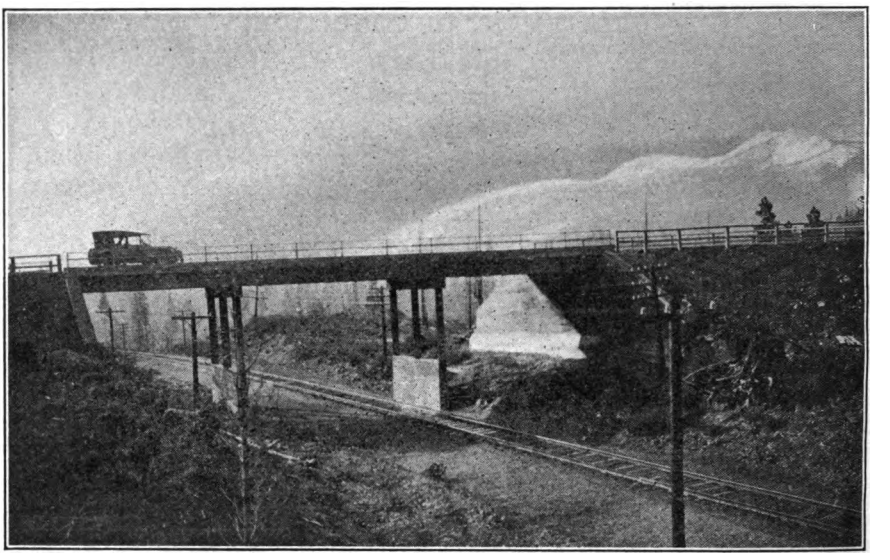


Plate XLIII. State Highway, Siskiyou County, Black Butte Overgrade Crossing.



Plate XLIV. Bridge on State Highway, Sierra County, over North Fork Yuba River.

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Third State Highway Fund expenditures:

2	Highways in process		$2,537,305 22
4	Office buildings		7,261 63
5	Sand plants		714 91
10	Maintenance yards		67,237 25
11	Powder magazines		128 40
20	Construction equipment	$66,789 41	
21	Engineering equipment	1,511 53	
22	Furniture and fixtures	7,859 97	
23	Stable equipment	23 19	
24	Auto equipment	71,963 35	
25	Camp equipment	6,354 37	
26	Laboratory equipment	4 26	
28	Shop equipment	864 28	
	Total equipment		155,370 36
35	Store account		37,313 44
43	Headquarters expense	$69,798 75	
44	Divisions expense	116,604 51	
72	County expense	84,936 70	
245	County expense (new routes)	164,490 91	
	Total expense		435,830 87
71A	Motor Vehicle Fund charges on State Highway Fund schedules		1,761 77
	Total Third State Highway Fund expenditures		$3,242,923 85

Motor Vehicle Fund expenditures:

103	Highway maintenance		$5,118,509 69
106	Oiling plants		53,924 80
108	Patrolmen's houses		928 81
110	Maintenance yards		129,832 61
120	Construction equipment	$210,348 98	
121	Engineering equipment	89 22	
122	Furniture and fixtures	346 17	
123	Stable equipment	678 18	
124	Auto equipment	193,983 31	
125	Camp equipment	7,514 32	
128	Shop equipment	16,083 08	
	Total equipment		429,043 26
135	Store account		26,418 83
145	County expense		21,892 92
	Total Motor Vehicle Fund expenditures		$5,780,550 92

Special appropriation expenditures:

301	Chapter 704, Acts 1915: Los Angeles County	$ 7,321 86
302	Chapter 748, Acts 1915: Ventura County	7,986 50
303	Chapter 746, Acts 1917: Klamath River Road	40,000 00
304	Chapter 746, Acts 1917: Trinity-Humboldt Extension	4,124 41
305	Chapter 746, Acts 1917: Oxnard-San Juan	12,914 61
306	Chapter 746, Acts 1917: Jackson's Ranch-Governor's Camp	3,033 01
307	Chapter 746, Acts 1917: Carmel-San Simeon	11,298 43
308	Chapter 746, Acts 1917: Carmel-San Simeon, Jolon connection	2,204 37
309	Chapter 746, Acts 1917: Dumbarton Bridge	2,240 71
310	Chapter 746, Acts 1917: Santa Maria-Cuyama	6,560 09
	Total special appropriation expenditures	$97,683 99

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Expenditures—contributions by counties, cities and Federal Aid:

401	Expenditures Humboldt County contributions	$80,992 63
402	Expenditures Shasta County contributions	64,000 00
403	Expenditures Siskiyou County contributions	45,345 33
404	Expenditures Glenn County contributions	8,421 52
405	Expenditures Contra Costa County contributions	3,056 93
406	Expenditures Marin County contributions	35,000 00
407	Expenditures Napa County contributions	65,000 00
408	Expenditures Sonoma County contributions	75,000 00
409	Expenditures San Luis Obispo County contributions	5,000 00
410	Expenditures Imperial County contributions	53,104 60
411	Expenditures Calaveras County contributions	20,000 00
412	Expenditures Mendocino County contributions	40,209 14
413	Expenditures Colusa County contributions	17,860 47
414	Expenditures Solano County contributions	5,000 00
415	Expenditures Mariposa County contributions	2,200 00
416	Expenditures Santa Barbara County contributions	55,415 75
417	Expenditures Kern County contributions	8,452 04
418	Expenditures Town of Niles contributions	2,143 86
419	Expenditures City of San Juan Bautista contributions	9,000 00
420	Expenditures City of El Cajon contributions	5,992 00
421	Expenditures Merced County contributions	2,707 88
422	Expenditures San Benito County contributions	2,000 00
423	Expenditures Tulare County contributions	1,658 66
424	Expenditures Yolo County contributions	4,837 77
425	Expenditures El Dorado County contributions	675 77
426	Expenditures Tuolumne County contributions	878 23
427	Expenditures Orange County contributions	9,001 50
428	Expenditures Nevada County contributions	634 17
429	Expenditures Stanislaus County contributions	8,532 48
		$632,120 73
481	Expenditures Federal Aid, San Mateo County	35,327 20
482	Expenditures Federal Aid, Contra Costa County	24,244 56
	Total contribution expenditures	$691,692 49

Cash on hand:

48	Office Fund (headquarters)	$ 125 00
49A	Office Fund (divisions)	42,500 00
50	National Bank of D. O. Mills and Company	38,777 34
52	Farmers and Mechanics Bank	29,000 00
53	California National Bank	1,780 76
54	Capital National Bank (General Fund)	15,292 13
54A	Capital National Bank (Revolving Fund)	10,537 42
	Total	$138,012 65

Funds in treasury:

91	First State Highway Fund	$100,000 00
92	Second State Highway Fund	55,179 09
93	Third State Highway Fund	3,819 28
94	Motor Vehicle Fund	367,264 07
95	Chapter 746, Acts 1917 Fund	167,624 37
96	Federal Aid Fund	286,451 51
	Total	$980,338 32

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EXPENDITURES IN COUNTIES FROM FIRST STATE HIGHWAY FUND.

County	Division	To June 30, 1920*	County	Division	To June 30, 1920*
Alameda	IV	$452,652 79	Sacramento	III	$103,912 63
Alpine	III		San Benito	V	230,836 93
Amador	III	406 49	San Bernardino	VII	261,021 75
Butte	III	306,654 17	San Diego	VII	622.188 21
Calaveras	III	5,793 78	San Francisco	IV	
Colusa	III	493,128 12	San Joaquin	III	4,278 08
Contra Costa	IV	251,686 37	San Luis Obispo	V	823,571 26
Del Norte	I	10,976 95	San Mateo	IV	425,128 89
El Dorado	III	287,149 73	Santa Barbara	V	839,664 59
Fresno	VI	248,399 38	Santa Clara	IV	923,022 63
Glenn	III	250,413 29	Santa Cruz	IV	215,027 48
Humboldt	I	673,221 05	Shasta	II	481,030 22
Imperial	VII	404,895 41	Sierra	III	17,763 75
Inyo	VI	21,609 25	Siskiyou	II	396,473 19
Kern	VI	882,644 61	Solano	III	402,995 94
Kings	VI	106,554 38	Sonoma	IV	494,848 22
Lake	I	16 04	Stanislaus	III	305,356 18
Lassen	II	714 35	Sutter	III	107,620 68
Los Angeles	VII	1,284,762 35	Tehama	II	297,610 42
Madera	VI	220,476 65	Trinity	II	7,029 96
Marin	IV	226,080 41	Tulare	VI	245,345 67
Mariposa	VI	190 337 16	Tuolumne	III	129,775 75
Mendocino	I	789,719 41	Ventura	VII	607,294 54
Merced	VI	342,940 97	Yolo	III	762,134 78
Modoc	II	33 06	Yuba	III	121,951 33
Mono	VI	88,025 19			
Monterey	V	618,929 66			
Napa	IV	19,330 09	Total		$18,000,000 00
Nevada	III	8,033 46	General expense, undistributed (premiums on bonds)		2,129 00
Orange	VII	528,908 27			
Placer	III	364,093 99	Grand total		$18,002,129 00
Plumas	III	58 58			
Riverside	VII	92,442 11			

*As the fund was exhausted on June 30, 1918, there have been no expenditures from this fund since that date.

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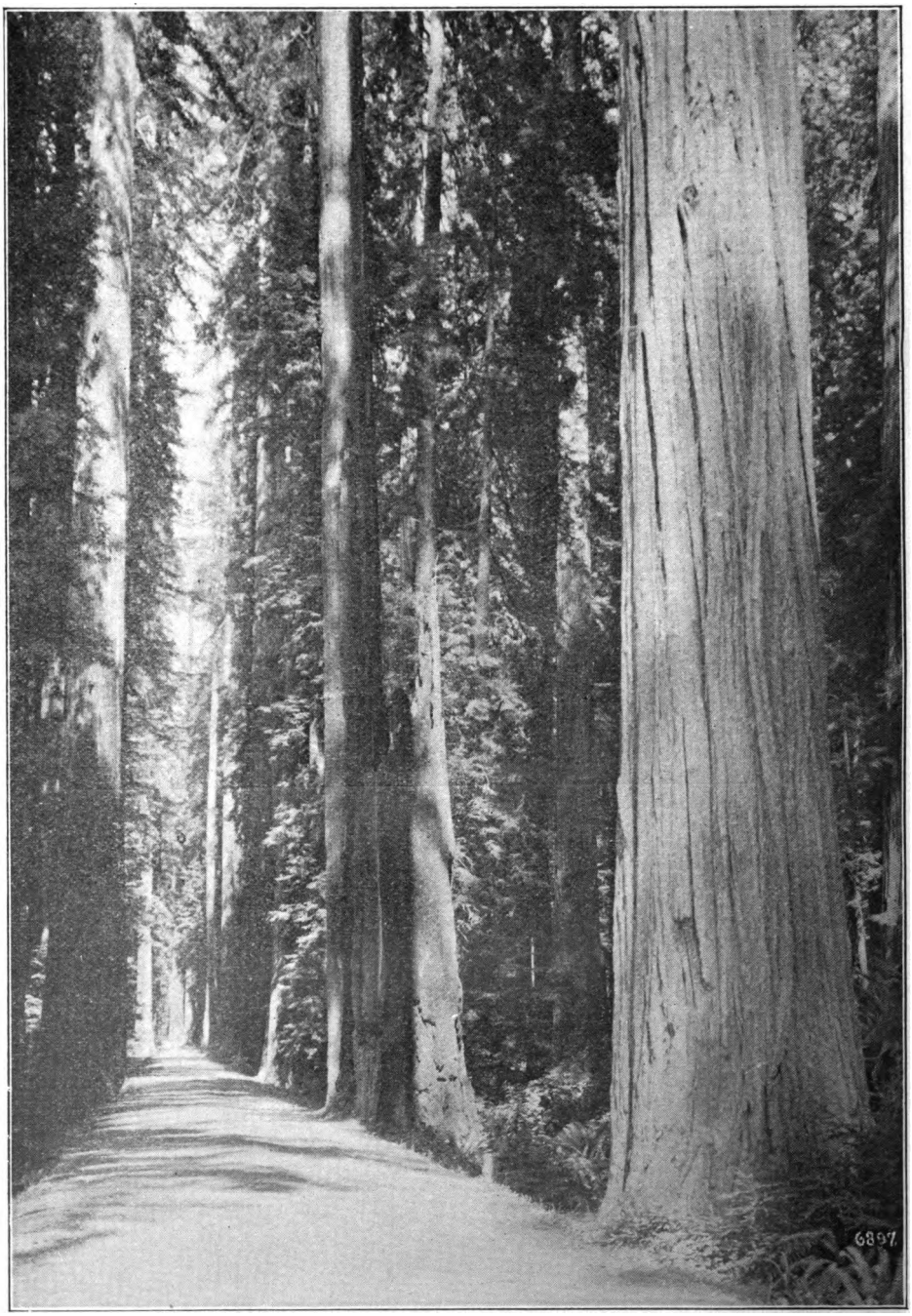


Plate XLV. State Highway, Humboldt County, near Bear Creek.

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EXPENDITURES IN COUNTIES FROM SECOND STATE HIGHWAY FUND. DURING THE FISCAL YEAR JULY 1, 1919, TO JUNE 30, 1920.

County	Division	Total this year	Previous report	Total to date
Alameda	IV	$38,481 65	$295,501 46	$333,983 11
Alpine	III			
Amador	III	1,530 52	6,137 81	7,668 33
Butte	III	245,805 76	343,222 22	589,027 98
Calaveras	III	30,447 74	94,889 14	125,336 88
Colusa	III	6 215 19	2,444 39	8,659 58
Contra Costa	IV	14,542 67	225,576 56	240,119 23
Del Norte	I	27,275 18	13,633 04	40,908 22
El Dorado	III	10,515 09	251,928 86	232,443 95
Fresno	VI	108,479 16	8,816 64	117,295 80
Glenn	III	4,488 71	1,284 43	5,773 14
Humboldt	I	200,565 37	373,657 67	574,223 04
Imperial	VII	115.758 28	89,112 70	204,870 98
Inyo	VI	57,657 86	87,524 87	145,182 73
Kern	VI	70,337 30	11,504 54	81,841 84
Kings	VI	1.895 96	506 28	2,392 24
Lake	I	22,228 58	5,711 60	27,940 18
Lassen	II	22,583 58	28,401 23	50,984 81
Los Angeles	VII	234,445 24	873,005 25	1,107,450 49
Madera	VI	912 10	275 69	1,187 79
Marin	IV	43,392 65	405,619 80	449,012 45
Mariposa	VI	23,480 67	169.594 87	193,075 54
Mendocino	I	230,440 39	677,930 59	908,370 98
Merced	VI	54,127 27	9,605 35	63,732 62
Modoc	II	41,521 10	2,556 13	44,077 23
Mono	VI	66.809 25	84,244 74	151,053 99
Monterey	V	230.917 99	643,155 63	874,073 02
Napa	IV	15,924 09	166,527 03	182,451 12
Nevada	III	113,761 36	175,436 95	289,198 31
Orange	VII	58 272 73	4.334 84	62,607 57
Placer	III	28,676 57	25,138 55	53,815 12
Plumas	III	7 00	2,566 70	2,573 70
Riverside	VII	5,721 79	83,422 35	89,144 14
Sacramento	III	503 10	8,407 11	8,910 21
San Benito	V	81 05	1.239 48	1,320 53
San Bernardino	VII	1,804 83	15,670 21	17,565 04
San Diego	VII	218,901 75	317,039 18	535,940 93
San Francisco	IV			
San Joaquin	III	110,675 82	9,487 96	120,163 78
San Luis Obispo	V	68,005 67	275,273 58	343.279 25
San Mateo	IV	110 58	14.253 11	14.363 69
Santa Barbara	V	77.609 70	640,630 95	718,240 65
Santa Clara	IV	24,410 00	60,623 72	85,033 72
Santa Cruz	IV	54.739 68	91.101 79	145,841 47
Shasta	II	257,270 66	636.487 91	893,758 57
Sierra	III	59.730 96	83.957 19	143,688 15
Siskiyou	II	56.071 50	99 308 37	155,379 87
Solano	III	117 37*	160,818 37	160,701 00
Sonoma	IV	32,242 05	232,315 01	264.557 06
Stanislaus	III	32,589 70	28.618 42	61,208 12
Sutter	III	4 75	16 71	21 46
Tehama	II	29,746 76	39,602 56	69,349 32
Trinity	II	113 805 67	14,337 57	128,143 24
Tulare	VI	18,137 85	453,224 70	471,362 55
Tuolumne	III	16,777 98	2,318 55	19,096 53
Ventura	VII	8,234 45	49,224 94	57,459 39
Yolo	III	149,720 04	149,117 08	298,837 12
Yuba	III	16,522 88	87,347 81	103,870 69
Totals		$3,474,878 86	$8,633,690 19	$12,108,569 05

*Credit, covering reduction in freight rate on cement.

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EXPENDITURES IN COUNTIES FROM THIRD STATE HIGHWAY FUND. DURING THE FISCAL YEAR JULY 1, 1919, TO JUNE 30, 1920.

County	Division	Expenditures for year*	County	Division	Expenditures for year*
Alameda	IV	$325 03	Placer	III	15,937 05
Alpine	III		Plumas	III	1,102 79
Amador	III	3,721 72	Riverside	VII	87,999 56
Butte	III	135,122 18	Sacramento	III	111 33
Calaveras	III	5,400 97	San Benito	V	553 15
Colusa	III	14,328 72	San Bernardino	VII	23,462 30
Contra Costa	IV	4,967 83	San Diego	VII	207,725 65
Del Norte	I	102,6 6 42	San Francisco	IV	218 99
El Dorado	III	3,984 04	San Joaquin	III	115,473 18
Fresno	VI	62,234 77	San Luis Obispo	V	14,047 58
Glenn	III	9,278 99	San Mateo	IV	12,479 01
Humbold	I	126,576 77	Santa Barbara	V	59,963 86
Imperial	VII	296,009 75	Santa Clara	IV	57,316 18
Inyo	VI	34,559 43	Santa Cruz	IV	9,396 33
Kern	VI	87,903 05	Shasta	II	47,518 95
Kings	VI	57 68	Sierra	III	11,031 62
Lake	I	73,743 93	Siskiyou	II	51,984 31
Lassen	II	9,405 59	Solano	III	4,602 92
Los Angeles	VII	136,442 14	Sonoma	IV	31,695 84
Madera	VI	198 42	Stanislaus	III	103,690 32
Marin	IV	3,871 80	Sutter	III	4,413 12
Mariposa	VI	34,131 85	Tehama	II	96,400 35
Mendocino	I	151,716 34	Trinity	II	72,008 00
Merced	VI	43,648 17	Tulare	VI	9,727 32
Modoc	II	22,455 74	Tuolumne	III	21,127 33
Mono	VI	26,005 07	Ventura	VII	48,762 37
Monterey	V	126,838 89	Yolo	III	18,229 64
Napa	IV	7,023 24	Yuba	III	2,862 28
Nevada	III	74,357 15			
Orange	VII	31,877 36			$2,752,604 71

*As this fund did not become available until after July 1, 1919, the above figures also represent the total expenditures to June 30, 1920.

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INTEREST CHARGED TO COUNTIES ON EXPENDITURES UNDER THREE STATE HIGHWAY BOND MEASURES.

County	For fiscal year July 1, 1919, to June 30, 1920 On expenditures to June 30, 1919	For fiscal year July 1, 1920, to June 30, 1921 On expenditures to June 30, 1920
Alameda	$33,833 48	$33,258 09
Alpine		
Amador	326 61	591 94
Butte	33,670 49	52,239 87
Calaveras	5,896 98	7,188 72
Colusa	19,016 21	19,729 41
Contra Costa	22,849 18	20,795 16
Del Norte	1,043 63	8,326 02
El Dorado	20,900 97	23,174 98
Fresno	10,626 56	21,929 03
Glenn	9,661 16	10,210 99
Humboldt	47,898 76	63,322 07
Imperial	19,929 02	42,806 48
Inyo	5,766 52	10,745 75
Kern	34,264 20	42,976 31
Kings	4,066 29	4,141 19
Lake	394 00	5,608 08
Lassen	2,018 79	3,552 78
Los Angeles	93,451 40	114,655 28
Madera	8,439 52	8,318 60
Marin	33,896 86	30,700 19
Mariposa	10,000 00	10,000 00
Mendocino	67,940 80	87,834 95
Merced	13,532 06	19,434 91
Modoc	124 25	4,233 49
Mono	8,272 23	6,250 31
Monterey	62,073 14	75,605 43
Napa	10,530 06	9,769 04
Nevada	10,096 41	20,108 80
Orange	20,413 94	25,510 38
Placer	15,086 17	17,889 78
Plumas	117 77	168 61
Riverside	7,996 80	12,060 62
Sacramento	4,422 80	4,303 78
San Benito	8,823 10	8,649 21
San Bernardino	10,896 72	11,829 27
San Diego	42,435 91	64,276 99
San Francisco		10 02
San Joaquin	655 42	14,472 03
San Luis Obispo	47,621 30	49,237 33
San Mateo	16,893 30	17,237 2[illegible]
Santa Barbara	67,484 06	59,835 10
Santa Clara	38,160 72	41,952 40
Santa Cruz	14,918 99	16 803 99
Shasta	53,012 72	42,768 93
Sierra	5,487 35	9,448 04
Siskiyou	20,279 24	25,777 12
Solano	24,546 72	22,548 56
Sonoma	34,168 54	33,108 96
Stanislaus	13,612 93	20,365 62
Sutter	4,114 34	4 278 49
Tehama	13.209 52	19,790 12
Trinity	924 78	10,000 00
Tulare	32,564 13	31,326 69
Tuolumne	5,[illegible]65 28	7,189 32
Ventura	25,333 26	27,994 97
Yolo	20,115 49	31,269 75
Yuba	10,0[illegible]7 10	9,935 56
Totals	$1,157,399 11	$1,397,391 71

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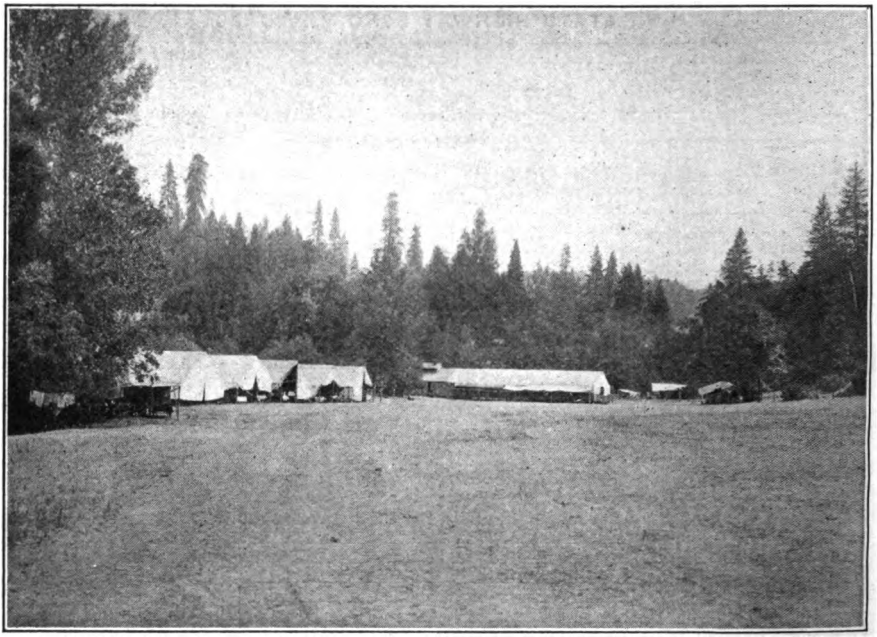


Plate XLVI. Convict Camp, Mendocino County, near Laytonville.



Plate XLVII. State Highway, Convict Work in Mendocino County.

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APPENDIX K.

CONVICT ROAD WORK IN DIVISION I.

By F. G. SOMNER, Division Engineer.

The administration of the convict labor organization is conducted in accordance with the "Convict Labor Law" enacted by the California legislature in 1915, which provides that the Department of Engineering shall supervise the road work and provide the camp and commissariat, and the Prison Directors shall have control over the discipline and conduct of the men. Convicts so employed are rewarded by additional good time allowance not to exceed one day for each two calendar days they are away from the prison.

The first camp, established in northern Mendocino County in September, 1915, provided for 47 convicts from San Quentin, but the number was soon afterwards increased to 60 men, and followed by the installation of another camp of 60 men; the organization reaching the maximum in July, 1917, of 225 men.

Descriptive.

The California Highway Commission was confronted with the problem of constructing one of the most important links on the Coast Route of the state highway in northern California at a time when the funds of the first bond issue were in a rather depleted condition. The portion of the route referred to is a section 33.10 miles in length extending from what is known as "Rattlesnake Summit", a point on the old overland road to Eureka, to the Mendocino-Humboldt County line, substituting an easy grade for the Bell Springs grade, which, attaining an altitude of 4100 feet above sea level, had always been a formidable barrier to tourist travel at all seasons of the year.

The "Convict Labor Law" provided a solution of the problem, the necessity, particularly at that time, of securing results being augmented by the fact that the rugged character of Rattlesnake Cañon and South Eel River with its remoteness from civilization afforded ideal conditions for the first step in the experiment of working prison labor. The country at that time was in a virgin state, sparsely settled by homesteaders and accessible by trails only, built by the engineers during the surveys of the proposed road.

The camps were located centrally, and an abandoned road opened up to the nearest coast port, "Union Landing". The men, equipment and supplies were transported 45 miles by trucks from Fort Bragg, the nearest railroad station. The construction progressed in both directions and, in the course of time, more accessible bases of supplies were reached and the transportation problem became easier.

Upon the completion of the stretch of highway described in the foregoing, the convict labor work was extended southerly from Rattlesnake Summit to Arnold, a station on the line of the Northwestern Pacific Railroad, distant 24.53 miles. Although this extension involved some heavy mountain construction, the work was facilitated due to the existence of old roads, and to the fact that the winter quarters were of easy

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access from the base of supplies. The total distance of 57.53 miles was completed on April 30, 1920, and the camps moved to Humboldt County.

The next convict labor work to be undertaken was on a 26 mile portion (Redwood Creek, Humboldt County, to the Humboldt-Trinity County line) of the Humboldt-Trinity lateral, known as "Route 20". This lateral extends from Arcata in Humboldt County for a distance of 102 miles to Weaverville in Trinity County and connects with the main north and south interior highway at Redding. The lateral, when completed, will furnish a connection between the coast and interior counties.

The proposed road with its easy grade and scenic attractions will be a revelation to those who have traveled the heavy grades (reaching 28 per cent), over the "Redwood Mountain" and "Three Creeks" summits.

This 26 mile section of road was selected by the Highway Commission to be built with convict labor again because of the rugged character of the cañons of Willow Creek and Trinity River, with its remoteness from civilization; that portion of the route traversing the cañon of Willow Creek being devoid of either roads or trails, or habitation.

Construction.

The construction of the road in Mendocino County involved a vast amount of preliminary work, including the reconstruction of an abandoned road from the coast to the camp sites; the erection of foot bridges (wire suspension) and temporary wagon bridges at several crossings of the South Fork of the Eel River; the installation of several miles of telephone line; and the building of pack trails for the transportation of supplies and the moving of camps in advance of the actual road construction.

The camps were inaccessible during the winter months, owing to the entire absence of bridges, so the transportation of supplies for the year had to be accomplished during the short summer season. The difficulties encountered, and the inaccessibility of the country, may be better judged when it is understood that the construction of the roadbed progressed in advance of the erection of nine bridges from 130 feet to 300 feet in length, and from 130 feet to 150 feet in height. Naturally such conditions were a formidable obstruction to the transportation of supplies and equipment, and moving of camps. The frequent suspension of steamboat transportation to the base of supplies further aggravated conditions, and take it all in all camp life was not without its trials, especially during the winter months with a season's rainfall reaching 75 inches.

The result of the labors of the convicts from San Quentin from September, 1915, to April 30, 1920, is the completed construction of 57.53 miles of mountain road. Thirty-five miles are from 18 to 21 feet in width, and 22.53 miles from 12 to 16 feet. The convict labor also took care of the maintenance of the road during the construction period and the removal of thousands of yards of slides, all of which work is included in the analysis of the cost of the construction of the road.

On August 15, 1917, the road was completed to a width of 12 feet, and on this date Governor Stephens and party, including the Highway

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Commissioners, made an official inspection of the "connecting link" with Eureka and the outside world, camping overnight in the redwoods near Bridges Creek. On July 1, 1918, the road was completed to a proper width and opened for travel.

The construction of the Humboldt-Trinity lateral where the camps have been located since May 1, 1920, did not involve a great amount of preliminary work, owing to the close proximity of the county road; however, unfortunately it was necessary to install the camps during the winter months, when the transportation of the equipment over roads hitherto deemed impassable during the rainy season, was tedious and expensive.

The camp was started with 60 men and increased to 90, the original plan being to increase the camp to 150 men during the summer months, but, owing to financial stringency it was deemed advisable to curtail the expenditures, and the camp has been gradually reduced to 70 men. For similar reasons the camp was divided in September and half of the camp delegated to the construction of a stretch of road on the coast, at what is known as "Worth Hill," a much needed improvement on the Eureka-Crescent City overland road, where mishaps sometimes of a serious nature had become of frequent occurrence.

The Humboldt-Trinity route attains an altitude of 2800 feet above sea level datum and is subject at times to severe climatic conditions, and although the summer season is generally mild, unprecedented cold and rainy weather has continued this year through the summer months, affecting the conduct of the camp to more or less extent, and consequently the progress of the work.

This season's work has contributed, so far, very little of interest to the public, except the anticipation of the elimination of exceedingly heavy grades, before the opening of the tourist season of 1921. The work will then be extended down the cañon of Willow Creek, through a country of rugged and picturesque character, and it is expected that the camps will reach a capacity of 150 men.

The result of this season's work of the Humboldt camps is five miles of graded road, from 13 to 21 feet in width.

Organization.

The Highway Commission is represented at each camp by a superintendent, who has full charge of the work, assisted by one or more foremen. A resident engineer is engaged to lay out the work and, with the assistance of a commissary clerk, he orders and disburses the supplies to the cookhouse and to the men.

The prison authorities are represented by a head guard, who, with two or more subguards, control the discipline and conduct of the men.

The men are not guarded and the guards are not armed, there being no firearms in evidence either in the camps or on the work.

A camp physician has been, until recently, in constant attendance at the camps and a dentist is engaged as the occasions demand.

The day's work consists of eight hours on the grade, Sundays and holidays excepted.

The men are housed in tents and frame buildings. The camps are well lighted and heated. The sanitation conforms to the regulations of the Commission of Immigration and Housing, which covers everything

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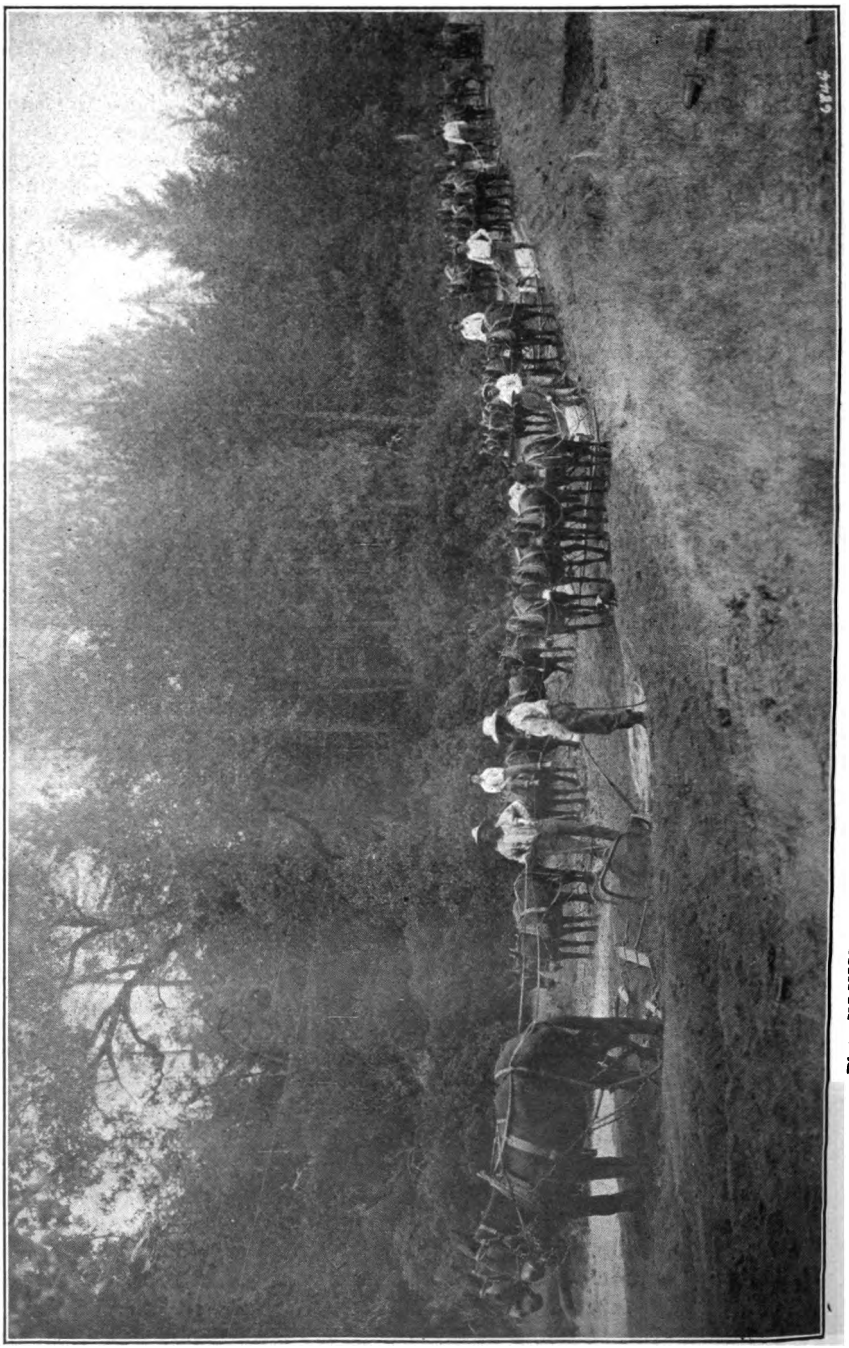


Plate XLVIII. State Highway, Mendocino County, Team Outfit at Work. All Convicts.

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conducive to cleanliness, health and comfort, including bathing facilities.

The food is wholesome and plentiful, the "convict ration" not being at all in evidence. The cooks are selected from the convict labor and their services are satisfactory.

Method of Construction.

The work is being accomplished by use of pick and shovel, and station cars, wheelbarrows, steam shovel, teams and scrapers and road graders operated by tractors, convict labor being employed in all processes with the exception of the operating crew on the steam shovel.

The drilling is accomplished by both hand labor and machine drills. Throughout the entire construction more or less rock has been encountered and the use of drills and powder has been an important factor in the prosecution of the work. The blasting operations have been extremely hazardous, involving the use of 300 tons of powder, and the men have displayed a remarkable aptitude for this class of work, both in caution and efficiency. Only one accident has occurred, for which no one was to blame, but, unfortunately, this accident proved fatal.

Conduct of the Camps.

The honor system is employed, the men being unguarded at all times, and it may be said the men have as a rule readily responded to the honor system; this, in the face of the diversified personnel of the camp, which comprises men serving sentences from a few months to life, and for crimes ranging from petty larceny to murder; men of all nationalities, from all grades of society and of all trades and professions.

The behavior of the men, both on the work and in the camps, and their efficiency on the work, compares favorably with that in free labor camps, and the exceptions are as few. As a rule a spirit of cheerfulness and contentment prevails; however, occasionally the desire for complete freedom is irresistible, although the percentage of escapes is small. Undesirable characters, such as malcontents, shirkers, etc., are promptly returned to the prison.

ANALYSIS OF COSTS TO SEPTEMBER 30, 1920.

	Mendocino camps	Humboldt camps
Guards	$0.132	$0.237
Transportation	.170	.180
Clothing	.250	.182
Subsistence	.952	1.013
Housing	.165	.198
Escapes	.035	.040
Medical	.056	.069
Tobacco	.052	.071
Cost per man day	$1.811	$1.990
Cost per effective man day	2.830	3.050

Total man days, Mendocino County	201,606
Total man days, Humboldt County	9,935
Number of men shipped to camps	955
Number of escapes recaptured	33
Number of escapes at large	16

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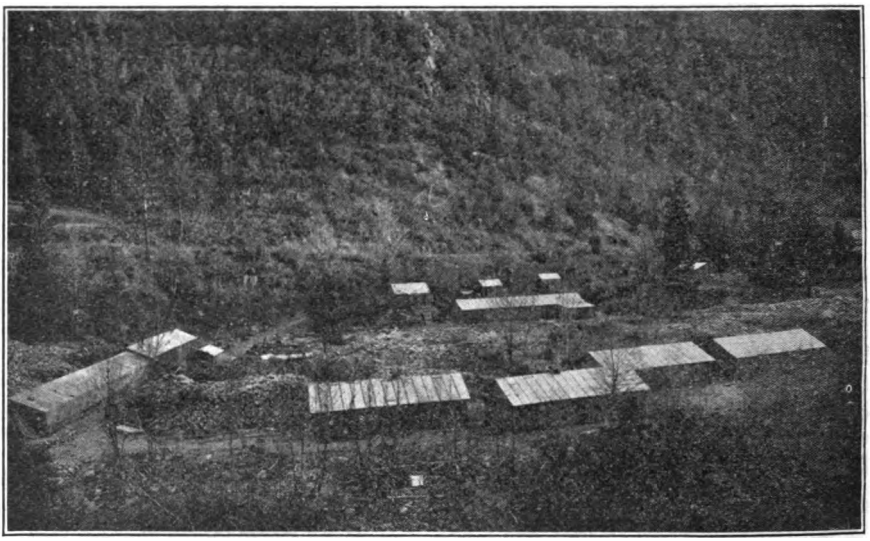


Plate XLIX. State Highway, Convict Camp, Sierra County.

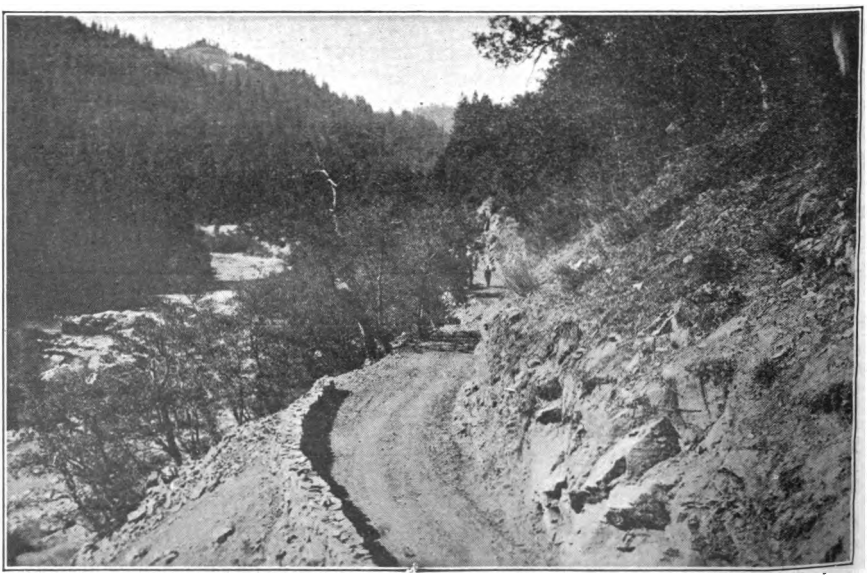


Plate L. State Highway, Sierra County, Convict Work near Downieville.

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The cost per effective man per day is arrived at by the application to the cost per man day of the percentage of time not applied on actual construction, which includes time for men employed about camp, lost time on Sundays, holidays, and on account of sickness and stress of weather conditions.

QUANTITIES AND COSTS.

	Mendocino County Excavation	Cost	Humboldt County Excavation	Cost
D-53	725,100 cubic yards at $0.69	$500,319 00	36,000 cubic yards at $1.333	$48,000 00
D-208	90,000 cubic yards at 1.40	126,000 00		
D-195	124,000 cubic yards at 1.30	160,200 00		
	989,100 cubic yards at $0.838	$786,519 00		
Culverts retaining walls etc.		$83,950 00		9,000 00
Totals		$870,469 00		$57,000 00

Total miles of road construction, 57.
Average cost per mile, $16,271.39.
Excavation per man day, 4 cubic yards.

The excavation includes clearing and grubbing and will average 65 per cent solid and loose rock. The expenditures for excavation, culverts, retaining walls, etc., include overhead and engineering, preliminary work and all else incidental to the construction of the road. The bridges were constructed by free labor and this expense is therefore not included in the foregoing statement of costs.

Conclusions.

The success or failure of convict labor on highway construction depends entirely upon the plan of organization. The proper application of reward for good conduct and diligence, and of punishment for misbehavior and indolence bears a most important relation to the successful administration of the organization.

Besides the incentive of additional good time provided by law, is the desire for wholesome outdoor life and intimacy with nature, and while the men are not without restraint in the camps, the discipline is easy as compared with the prison regime. They are on their honor and logically enjoy the essential liberties of free men.

From the convicts' point of view, to achieve the privilege of "making the road camp" is the great good fortune open to a prisoner; likewise, having secured this opportunity the greatest calamity that can befall him is being returned to the prison. Herein lies the success of the work, for in all the walks of life most men labor not, except for profit, and the men from San Quentin are very much like unto other men.

The wisdom of the policy of the Highway Commission in placing the camps in remote localities difficult to access is unquestionable. First, such conditions are least attractive to contractors and to the free labor, so the convict is not taking labor from free men; secondly, the associations of convicts with free men must be reduced to the minimum if the success of the camps is to be insured. Even casual touch with free

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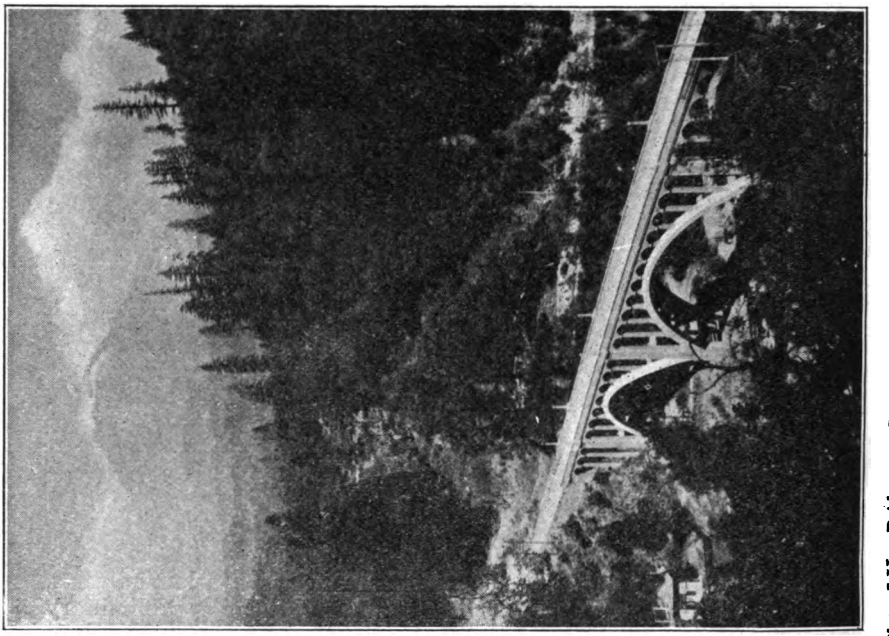


Plate LII. Bridge on State Highway, Siskiyou County, at Dunsmuir.



Plate LI. State Highway, Shasta County, near Castella.

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people has been found to be the source of good or evil, both to society and to the camps, depending on the life of the neighborhood. Petty crimes in the camps can thrive only when there are petty criminals in the surrounding free community ready and eager to encourage crime. Invariably it is found that the camps reflect the moral weakness or strength, as the case may be, of the free inhabitants of the locality.

An important essential in the administration of the organization is the morale of the camps. The men must live in an atmosphere of happiness and contentment, which can best be attained by wholesome food and clothing, sanitary and comfortable quarters, and above all a high standard of character among those in authority. The men must at all times be made to feel that there is no opportunity for prejudice or injustice; without these conditions the camps can not possibly succeed.

The principles involved in the employment of prison labor on road construction can hardly be questioned. They are based on the assumption that a certain percentage of prisoners will make good if given the opportunity. Why not? The spirit, muscle and brains are there and if the standards of justice, industry and uprightness are held up by those in direct authority, the men will generally respond. On the other hand, incompetency and lack of character on the part of either the Highway or Prison representatives will soon create an atmosphere of indolence, rebellion and defeated hopes.

Proper coordination between the Prison and Highway authorities is a requirement of paramount importance, and the existing cooperative spirit of the Prison authorities has contributed to whatever measure of success with which the camps may be credited. The discernment of the Prison Warden and his lieutenants in the selection of men for the camps is a factor of paramount importance.

From an economic standpoint the experiment of employing convict labor on state highway construction has produced satisfactory results. The construction of a modern highway is certainly a profitable exchange for the expense of maintaining the camps, when it is considered that much of the public funds in any case would have been spent in maintaining the same men within prison walls, with very little, finally, to show of benefit to either the men or the state.

From a social standpoint the venture is not without returns. The conditions make for social diversion and broadening of the men and contribute to their general efficiency; among them the hardened criminal is the exception. After a few months or years, most of them pass back into the various walks of life.

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CONVICT ROAD WORK IN DIVISION II.

By THOMAS A. BEDFORD, Division Engineer.

In July, 1916, a convict labor road camp was established in Yuba River Canyon, Sierra County, California. The work was heavy, running 8500 cubic yards per mile, mostly solid rock. Food and accomodations were excellent and conditions in general ideal, but results were very unsatisfactory at first.

The first nine months were spent in trying to work under a law which gave the prison authorities and the Highway Commission equal authority in the supervision of the convicts and their work.

"No man can serve two masters," much less a convict, and the project was a failure until March, 1917, when the prison authorities gave to the Highway Commission full control. Since that time the organization has been so perfected and the interest in the convict work so improved that the work is being done now for much less than the Commission would pay a contractor. The convicts have moved about half a million cubic yards of earth and rock excavation at an average cost of seventy cents per cubic yard. This material is largely rock, and it is safe to say that it would have cost an average of one dollar per cubic yard if it had been done by contract.

There are very few skilled laborers among the convicts on whom much dependence can be placed. It is, therefore, a problem of getting the most out of a lot of simple-minded laborers, the personnel of which changes rapidly. Machinery and other refinements must be introduced very slowly and to a limited extent only. Only simple methods are used, therefore, and equipment such as powder, pick and shovel, the wheelbarrow, and cars with track, and the plow and scraper to a limited extent.

The things most essential are complete control of the forces, full cooperation on the part of the prison authorities, and a competent superintendent. There are very few men capable of handling convicts who are willing to take a position as superintendent and live with them. The position requires a young, big-hearted chap, full of energy, who can use tact and firmness and still be pleasant and respectful.

Another matter of great importance is the selection of the convicts. There should be no short-termers; that is, those with not less than six months to serve, and they should, of course, all be healthy, ablebodied men. Some of the best men are life-termers, and some good men are third and fourth termers, though they are long-termers. The short-term "repeater" is a weak, dissolute character, who is physically and mentally unfit for work.

At present (November, 1920) the camp contains about one hundred and fifty convicts, four guards, seven foremen, one superintendent, one timekeeper, one engineering inspector, who is really a foreman on reinforced concrete work, and about six freeman truck drivers.

Guards are not used as foremen, but for police duty only, except that when it is necessary to scatter the men to such an extent that seven foremen cannot see them all, the guards are depended on to see that the men keep working.

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Guards seldom make good foremen. They do not understand road work. It is out of their line of business. Furthermore, the placing of the guards in authority who are appointed by the prison authorities is recognizing the dual authority, which will soon destroy the organization and cause all kinds of trouble in camp.

The most economical and satisfactory housing is well-built shacks constructed of lumber and tar paper. Tents are expensive and unsatisfactory.

In general, the bunk houses are twenty-five to thirty feet wide by fifty to sixty feet long and are heated by two large wood stoves in winter, and ventilated by large screened windows, covered by shutters hinged on the upper edge, but smaller houses are better and more sanitary, though more expensive.

Each man is provided with a steel spring cot, a cotton mattress, and plenty of blankets and warm clothing, and he is required to keep himself and his clothing clean.

Shower baths are provided with plenty of hot water, and the convict is given all the good wholesome food he can eat, and plenty of tobacco. He is better cared for than he would be in any free labor camp. Criticism has been made that they are treated too well, but experience proves that it pays to treat them well.

Between July, 1916, and November, 1920, forty-one miles of road have been built by convict labor between Nevada City and Downieville, as follows:

Nev–25–A, D–175	16 miles
Yub–25–A, D–154	13 miles
Sie–25–A, D–116, M. R. 438–M. R. 568	12 miles

The greater portion of the road lies in the three Yuba River canyons, a rough, rugged, mountainous country where transportation of men and supplies is expensive in summer and almost out of the question in winter. Enough supplies must be stored in camp by the middle of November to last until the middle of April on account of snow and the impassable condition of county roads which have to be used until the highway is finished.

Five hundred thousand cubic yards of material, principally solid rock, have been excavated, and the greater part of the road has been surfaced with gravel.

The plans call for a road twelve feet wide in excavation and fourteen feet wide in embankment, but the greater part of the roadway is actually two to four feet wider on account of swell in the rock and the day-lighting of small cuts.

The following tabulation of costs is interesting:

Excavation, 500,000 cubic yards at 70 cents	$350,000 00
Culverts, bridges and retaining walls	126,000 00
Gravel surfacing, 12 miles at $2,000	24,000 00
Forty-one miles of road at $12,195	$500,000 00

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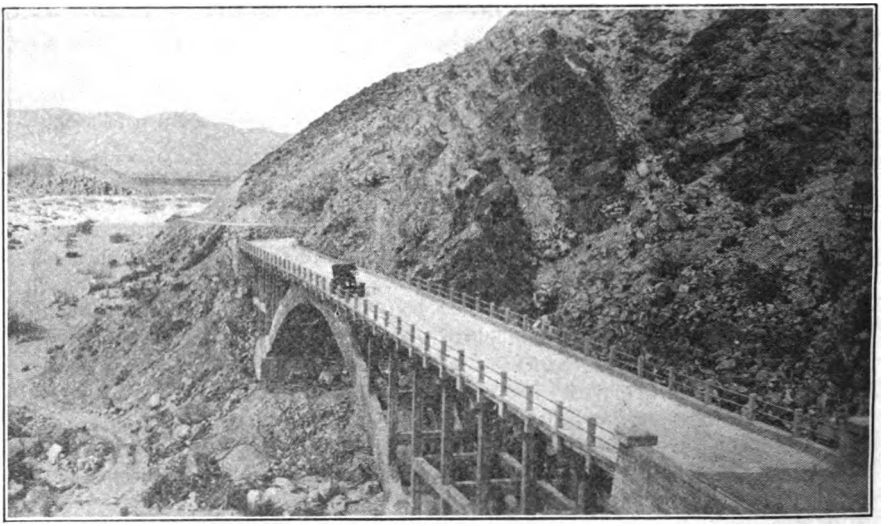


Plate LIII. Bridge on State Highway, Imperial County, over Myers Creek.

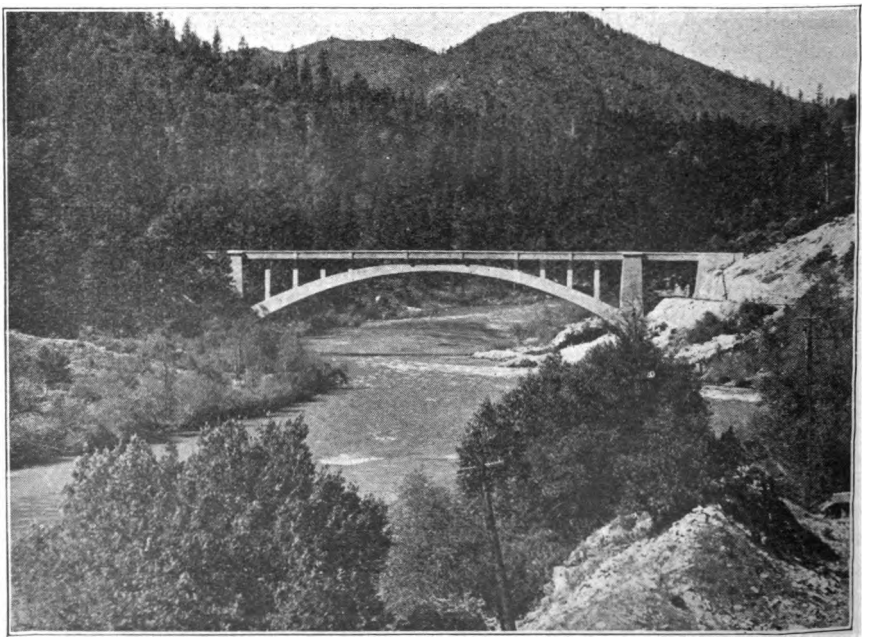


Plate LIV. Bridge on State Highway, Shasta County, over Pit River.

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DISTRIBUTION.

Pay roll	$150,000 00
Food Supplies	130,000 00
Trucking	30,000 00
Explosives	26,000 00
Cement, corrugated pipe, steel, etc.	51,000 00
Clothing	23,000 00
Tobacco	5,000 00
Equipment and miscellaneous	85,000 00
Total	$500,000 00

Just now the convict camp is a very efficient and money saving institution. Comparing it with free labor, the convict work day costs about $2, while free labor costs $5.50 per day, and the convict will do more work than the average free laborer available at the present time.

The cost of convict work day for the period of seven months ending July 31, 1920, was as follows:

Food	$0.78
Hauling food	.023
Transportation	.043
Guarding	.148
Clothing, medical, tobacco	.152
Escapes	.084
Depreciation equipment	.035
Camp maintenance	.015
Preparing and issuing food	.052
Total cost per convict day	$1.332
Total convict days	26,328
Lost time, account Sundays, holidays, sickness, bad weather, work in camp and cook houses, etc.	8,521
Effective days work on road	17,807

Cost per effective day (January 1, 1920, to July 31, 1920):

$$\frac{1.332 \times 26328}{17807} = \$1.97.$$

The following data shows how the convict force fluctuates in personnel:

Convicts in camp January 1, 1919	118
Convicts received January 1, 1919, to November 1, 1920	421
Total	539

Returned to Prison

Paroled and discharged	169	
For cause (violation of camp rules, laziness, etc.)	59	
For medical and dental treatment	91	
Miscellaneous	49	
Escapes (18 captured)	21	
Convicts in camp November 30, 1920		150
Grand total		539

Thirteen men (11 on parole, 2 discharged) are now working for the California Highway Commission in this Division.

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APPENDIX L.

PRESERVATION OF NATURAL SCENIC BEAUTIES OF STATE HIGHWAYS IN CALIFORNIA.

The California Highway Commission commenced actual state highway construction in the year 1912. In September of that year the following resolution was adopted by the Commission:

"*Voted*, That it be the policy of the Commission that standing timber upon rights of way of state highways in the forest districts of the state be preserved, and that rights of way be acquired with the standing timber thereon, and that landowners be encouraged to leave timber uncut for considerable distance on both sides of highways in order to enhance the scenic beauty and attractiveness through wooded portions of California."

From the outset of its work, therefore, the Commission has encouraged the preservation of trees along the state highways, as well as the planting of new trees along the roadside.

The various boards of supervisors, civic societies, and individuals have cordially cooperated with the Commission in carrying out this policy.

In 1915 the Legislature of California adopted an act providing for the acquisition by the State Department of Engineering of additional rights of way along state highways (chapter 23, Statutes of 1915 of California) designed to further enable the proper state authorities to preserve trees and other natural attractions along state highways.

The terms of this act are as follows:

Section 1. The Department of Engineering may acquire for and in the name of the people of the State of California, by purchase, donation, dedication or by proceedings in eminent domain, rights of way, land or trees and ground necessary for the culture and support thereof on or along the course of any state highway, within a maximum distance of three hundred feet on each side of the center thereof, in any case when the acquisition of such rights of way, land and trees will be for the benefit of a state highway in aiding in the maintenance and preservation of the roadbed of such highway or aid in the maintenance and preservation of the attractions and scenic beauty thereof.

Under the provisions of this act the State Engineering Department obtained a number of miles of additional rights of way along the Lake Tahoe State Road above Placerville for the purpose of saving the trees, which were about to be cut by lumber interests, from destruction, and the result has been that the state by its intervention has preserved a beautiful stand of trees along that highway much to the comfort and satisfaction of the traveling public.

Other laws passed by the Legislature of 1915 relate to the subject of trees.

Section 7, chapter 400, Statutes of 1915 of California provides as follows:

Any person who digs up, cuts down, injures or destroys any trees on any state road or highway, unless the same is deemed an obstruction by the department of engineering, its officers or employees and removed under their direction, unless such person has received a permit therefor from such department or its appropriate officers, or is otherwise lawfully entitled to dig up, cut down, injure or destroy such trees, shall be guilty of a misdemeanor.

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Chapter 99, Statutes of 1915, provides as follows:

Section 1. No opening shall be made in any state road or highway nor shall any structure be placed thereon, nor shall any structure which has been placed thereon be changed or renewed except in accordance with a permit from the state department of engineering or its duly authorized officers, who shall exercise complete and permanent control over such roads or highways. No state road or highway shall be dug up for laying or placing pipes, conduits, sewers, wires, railways or other objects, and no tree or shrub in or on any state road or highway shall be planted, trimmed or removed, and no obstruction placed thereon, without a written permit as hereinbefore provided, and then only in accordance with the regulations of such department of engineering or its duly authorized officers or employees and the work shall be done under the supervision and to the satisfaction of the department of engineering or its appropriate officers or employees, and the entire expense of replacing the highway in as good condition as before shall be paid by the persons to whom the permit is given or by whom the work is done; but a city or town may, within its corporate limits, dig up a state road or highway without such approval or permit in case of immediate necessity; but in such cases it shall be forthwith replaced in as good condition as before at the expense of the city or town.

The department of engineering, or its duly authorized officers, may in its discretion, before granting a permit under the provisions of this act, require the applicant to file a satisfactory bond to the people of the State of California in such an amount as may be deemed sufficient by the department of engineering or its duly authorized officers, conditioned for the proper compliance with the requirements of this act by the person granted such permit.

Any person convicted of making any opening in a state road or highway or placing any structure thereon, or changing or renewing any structure thereon without obtaining a permit, as herein provided, or not in compliance with the terms of such a permit, or otherwise violating the provisions of this act, shall be guilty of a misdemeanor.

Sec. 2. This act is not intended nor is it to be construed as limiting the powers and duties vested by law in the railroad commission of the State of California, and in the event of any conflict of jurisdiction, that of such railroad commission shall prevail.

Under the two foregoing acts the California Highway Commission through the requirement of permits has closely regulated the cutting and trimming of trees by public service corporations and others.

This Commission is now cooperating with the State Board of Forestry by the purchase of land for the installation by the latter board of a nursery for propagating trees to be planted along the state highways of California.

The most notable groups of trees in California along the state highway system are the redwood forests of Mendocino, Humboldt and Del Norte counties. In this district the Commission, much to its regret, found itself unable to carry out its policy of acquiring rights of way with standing timber thereon as fully as it would like to have done.

The cost of acquiring a strip of timber six hundred feet wide would have been immense and the funds provided for the state highway system were not adequate for such use.

However, at that time the possibility of the cutting off of the timber for many years, if ever, appeared very remote but unexpectedly with the opening of the state highway a number of camps were installed for the cutting of the redwood trees into railroad ties and grape stakes.

Some time intervened before friends of the redwoods awakened to the fact that if the cutting continued one of the greatest natural assets of this state would be lost to the residents of and visitors to that section of California.

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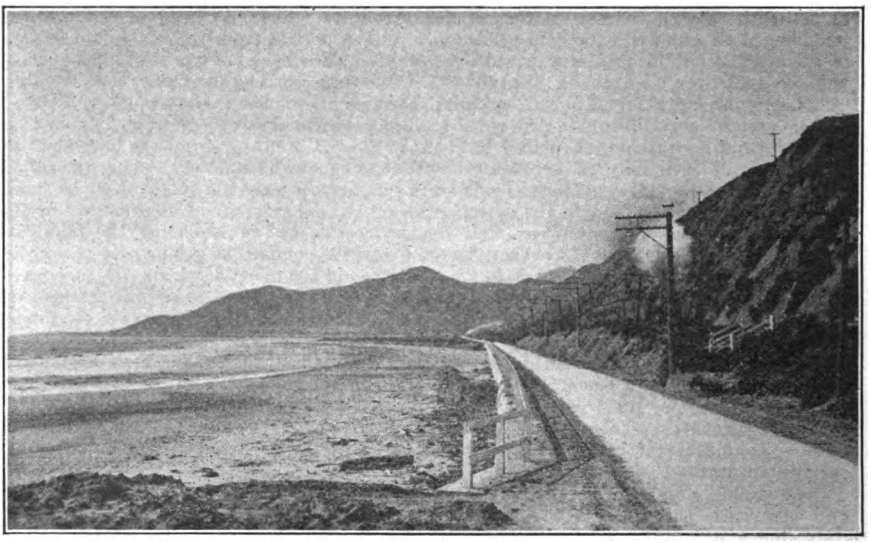


Plate LV. State Highway, Ventura County, near Ventura.

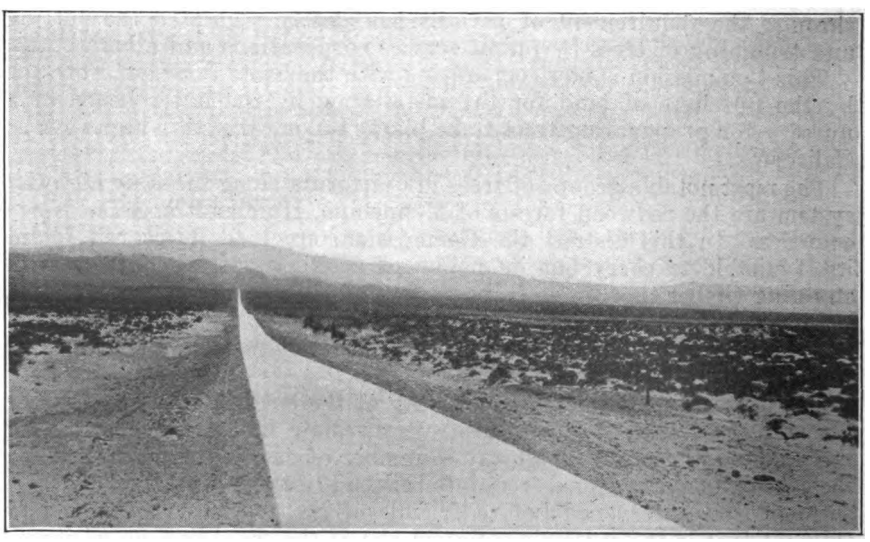


Plate LVI. State Highway, Imperial County, on the Desert.

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About a year ago a determined and organized effort was made by the board of supervisors of Humboldt County and prominent citizens of this and other states, the result of which was the raising of sufficient funds to induce the timber cutters to refrain from further cutting for a specified period of time. In the meantime plans are being promoted for the creation of several parks of the redwoods besides the preservation of the trees along the state highway itself.

Not only has the Commission sought to preserve and encourage the planting of trees along the state highways but it has also endeavored to protect the other natural beauties of the country traversed by the state highway system.

A successful campaign has been waged against signs and our law on that subject, in so far as state highways are concerned, is as follows:

Sec. 6. No sign, picture, transparency, advertisment or mechanical advertising device shall be placed upon or over any state road or highway without a permit from the department of engineering or its appropriate officers, and, if so placed, shall be a public nuisance and may be forthwith removed from any such road or highway by the department of engineering, its officers or employees, and any person who shall so place the same shall be guilty of a misdemeanor; *provided, further*, that nothing herein shall be so construed as to prevent the posting of any notice provided by law or order of any court to be posted. (Chapter 400, Statutes of 1915 of California.)

In fact, the sign evil on the state highways has been practically eliminated.

In these and other respects, in fact, in the location of the state highways, the California Highway Commission has been very zealous in the exploitation and perpetuation of the scenic beauties of the regions traversed thereby.

C. C. C.

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APPENDIX M.

STATE HIGHWAY CONSTRUCTION THROUGH THE RICE FIELDS OF BUTTE COUNTY.

The development of rice growing in California during the last seven or eight years has increased the difficulties and expense of highway construction very materially.

In the preparation of the land and the cultivation of rice the field is checked by contour checks about one foot high into irregular areas, approximately one-third of an acre, each succeeding check, in conformity to the slope of the land, being three or four inches lower than the adjoining one.

During March, or as soon in the spring as the weather will permit, the ground is plowed and sowed to rice. Water is then applied so as to keep the soil moist but without having the water stand on the field. By the first of May the rice is about three inches high and the first irrigation water is turned on to a depth of two inches. As the rice grows the depth of water is increased until six inches is reached and water is kept at this depth until the rice ripens, about October 15th, when the water is turned off, the field allowed to dry and reaping is begun.

During all of the irrigation period, the water must be kept flowing in the checks to insure successful growth and this practice causes much waste water. An average of over eight feet of water is required over the entire field for a season's irrigation, though some fields do not require over five feet.

The only time there is no water on the land is the period of not more than a month preceding planting and the period from the time the field dries in the fall till the rains set in.

If the rains set in early, it frequently happens that there is considerable loss due to the fact that the ground does not dry out sufficiently to permit harvesting.

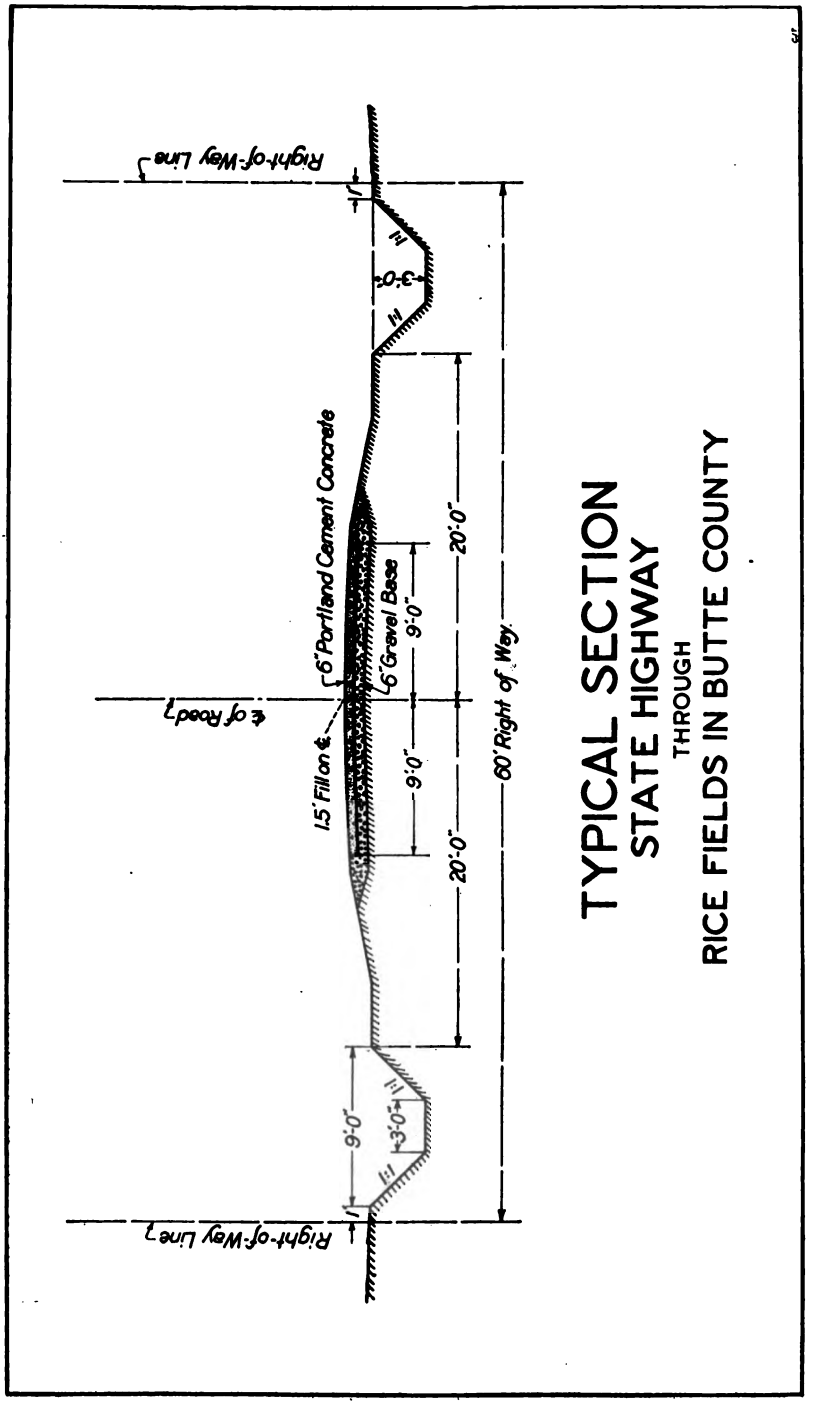
In 1914, in the rice fields of Butte County, approximately 4000 acres were left uncut due to the early rains which left the ground too wet to drive a reaper over. This condition can be remedied, however, to a large extent by the construction of proper drainage canals.

In the early stages of rice cultivation in California insufficient attention was given to the drainage feature with the result that the land soon became waterlogged. Adequate drainage is essential to successful rice production. Planting and harvesting are both delayed while the soil remains wet, and the removal of alkali salts and the relief of waterlogged lands are dependent upon drainage facilities.

The early lack of drainage ditches likewise soon caused a serious condition of the roads over which the rice must be hauled to market as well as being the cause of the complete failure of many main traveled highways which had been constructed prior to the advent of the rice grower.

Rice is now grown quite extensively in practically all of the Sacramento Valley counties, the acreage having increased rapidly from a bare 15,000 acres in 1914 to over 125,000 acres in 1919.

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Plate LVII. On Route of State Highway, Humboldt County, Showing Destruction of the Redwoods.



Plate LVIII. State Highway, Humboldt County, Showing Lumbering Operations.

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Practically the only drainage in the early stages was along the natural runoff channels and no drainage ditches were provided parallel with the highways.

In some places it even became the practice to utilize the natural channels as the routes of the main canals and irrigation water was transferred from one side of the highway to the other through the culverts and bridges spanning these natural channels.

In order to make these channels perform the duties of canals, levees were erected on each side where the canal crossed the highway borrow pits, thus closing the outlets of these pits.

Drainage and seepage from the rice fields into the borrow pits being held back by the levees softened the subgrade along several sections of state highway in Glenn and Colusa counties to such an extent that the concrete base failed under the pounding action of overloaded trucks traveling at excessive speed.

Several miles of a section of state highway in Glenn County between the southerly boundary and Willows constructed in 1914 and 1915 before any extensive acreage had been planted to rice, due partly to the saturated subgrade and partly to the alkali in the drainage water, have failed completely in the last two years.

Bids were advertised to be opened on November 26, 1917, on a section of state highway in Butte County between Biggs and Nelson.

Due probably to the fact that a portion of the above section is through a rice country and also due to the unsettled labor conditions no bids were received. Bids were again called for June 24, 1918, but again none were received.

This section was the only unpaved section on the main line along the east side of the Sacramento Valley between Sacramento and Chico and, as the prospects of securing any bids were unfavorable, it was finally decided to proceed with the paving by day labor.

As stated above, a portion of the section in the vicinity of Richvale is through a rice district. When grading was started on this portion in the latter part of 1918 it was found to be impossible to handle the water soaked adobe with teams and fresnos.

In the meantime experience in Glenn County had shown that unless adequate drainage ditches were provided and the concrete base increased in thickness and reinforced, early failure would result.

In Butte County a black clay adobe formation overlies the hardpan for an average thickness of three feet. When the water is turned off the rice fields at harvest time the season is too late to permit the adobe to dry out sufficiently so that teams can be used in grading the soft mud.

Arrangements were therefore made to rent a ditching outfit and to dig a ditch on each side of the highway, 3 feet deep and 3 feet wide on the bottom with 1:1 slopes, making a top width of 9 feet. The dirt was deposited in the center of the roadway with a 3 foot berm between the toe of the roadway slope and the edge of the ditch.

The ditcher was first operated on one side of the road, cutting the ditch and distributing the material towards the center of the roadway. The bucket of the machine had a swing of about 24 feet and was equipped as a drag line, cutting towards the machine. The ditcher was

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moved on skids by its own power exerted on a cable attached to a deadman.

Having cut one side the ditcher was turned around and cut back on the other side. As soon as the material thrown out of the ditches into the roadway had dried out sufficiently, fresno and grader teams were put on to make and shape the grade.

When possible the drainage ditches dug by the ditcher were led into main drainage ditches excavated by the rice companies or landowners. In some cases, however, outlet ditches have not yet been dug by the property owners and the seepage water is standing in the borrow pits along the highway. Strong efforts are being made, however, to provide proper outlets at all points so that there will be no standing water along the highway.

The ditching with the machine cost approximately 40 cents per cubic yard of dirt handled. On top of the grade thus built there was spread six inches of gravel 22 feet wide. A Portland cement 1:2:4 mixture, concrete base 18 feet wide by six inches thick reinforced with $\frac{3}{8}$ inch square rods spaced 18 inches apart and with a $\frac{3}{8}$ inch rod along each edge was then constructed on top of the gravel foundation. The gravel worked into the comparatively soft adobe subgrade to a certain extent, thus providing a hard and firm foundation for the pavement base. No special difficulties were encountered either in the ditching or in the construction of the pavement. Due to labor and car shortage, however, the progress of work was hampered to such an extent that, though started in the fall of 1918, the pavement was not completed until the fall of 1920.

The total length of the section is 12.5 miles but the southerly 6 miles are along an old road where the soil conditions are such that no special construction was considered to be necessary.

The northerly 6.5 miles, however, are practically entirely through an adobe formation which has been planted to rice, and the special construction described above was adopted throughout on this portion of the section. These 6.5 miles cost approximately $341,000, or at the rate of $52,500 per mile.

T. E. S.

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APPENDIX N.
VOTE ON STATE HIGHWAY BOND ISSUES, 1910, 1916, 1919, AND AMENDMENT No. 9, 1920.

Counties	1910—$18,000,000 Issue		1916—$15,000,000 Issue		1919—$40,000,000 Issue		1920—Amendment No. 9		
	For	Against	For	Against	For	Against	For	Against	Ratio to 1
Alameda	10,199	5,328	63,268	11,561	20,005	3,733	51,054	37,224	1.37
Alpine	28	3	49	5	25	2	13	20	1.54
Amador	304	364	1,655	288	786	83	738	793	1.07
Butte	1,557	831	5,195	1,427	2,243	284	4 844	1,937	2.50
Calaveras	454	420	1,321	390	694	174	891	668	1.31
Colusa	408	338	1,516	458	841	217	1,425	798	1.79
Contra Costa	1.275	782	7,513	1,653	3,245	331	6,029	5 156	1.18
Del Norte	193	39	739	37	380	12	686	91	7.54
El Dorado	1,608	283	1,576	431	838	193	1,223	770	1.59
Fresno	2,092	2 813	12,325	5,958	5,103	517	12,905	8,232	1.57
Glenn	348	285	1,761	515	911	118	1 140	1,258	1. 0
Humboldt	1,300	1,000	6,102	1,811	2 909	691	5,158	2,287	2. 8
Imperial	3:6	365	4.549	578	2,121	64	3,383	1,975	1.71
Inyo	442	118	1,413	144	502	38	1,420	294	4.83
Kern	1,361	543	9,346	1,103	4,002	334	7,617	3,474	2.20
Kings	401	659	3,552	737	1,'11	122	2,120	1.558	1.36
Lake	293	319	1.414	244	845	3'	927	530	1.75
Lassen	229	160	1 251	260	683	89	1 211	541	2.24
Los Angeles	7,665	26,954	126.331	39,485	40 351	5,838	106 395	86,155	1.23
Madera	312	156	1,732	464	55	166	1,614	713	2.31
Marin	1,458	539	5,788	783	2 191	281	4,072	2,527	1.61
Mariposa	185	106	818	139	371	34	5'9	187	2.78
Mendocino	963	608	3,269	1,513	1,943	296	4,93'	944	5.23
Merced	533	359	3,401	614	1.593	2 1	3,163	1,299	2,43
Modoc	274	122	1,045	333	9 0	142	575	6'6	1.07
Mono	84	29	169	37	108	8	153	32	4.78
Monterey	1,183	520	5,193	8'5	2,181	331	4,546	1,708	2.66
Napa	645	750	3,742	1,2'3	1.720	200	2 054	2,185	1.'0
Nevada	905	436	3,328	999	1.6'8	93	2,167	600	3.46
Orange	555	2,107	9,382	3,575	3,538	340	7,426	6,133	1.21
Placer	1,180	406	2 892	816	1,206	170	1.718	2,125	1.24
Plumas	240	174	815	201	654	54	671	437	1.54
Riverside	635	1,896	7,'30	2.383	2,015	374	5,801	4,323	1.34
Sacramento	5.234	1,385	11,565	2,29'	5.603	788	7 292	11 648	1.00
San Benito	309	372	1,768	562	853	132	1 386	1,150	1.21
San Bernardino	1,463	2,451	10.840	4 490	3,360	438	7,'11	8.076	1.09
San Diego	1,665	3,334	18,943	3,778	8,734	735	11 904	9,886	1.20
San Francisco	22,686	8,153	93.7'6	16 647	28,618	3.500	82,132	41,890	1.96
San Joaquin	2,028	2.429	10 6'2	4,024	3,156	922	9 929	6,345	1.56
San Luis Obispo	958	537	4 913	6'7	2,294	322	2,887	2 290	1.26
San Mateo	1,549	542	5,'58	1.163	2,492	281	5 2'9	2,959	1.76
Santa Barbara	1,292	577	6.2'5	9'5	1,903	261	4,000	4,271	1.07
Santa Clara	3,467	2,103	18,161	5,544	5,115	1,'86	14,512	9,218	1.57
Santa Cruz	1,094	9'5	6 0'8	1,159	2 872	190	3,040	3,123	1.03
Shasta	974	458	3,000	782	1,143	248	1,650	1.061	1.53
Sierra	289	74	507	90	317	29	351	164	2.14
Siskiyou	1.081	367	3 028	1.004	1,693	267	2,046	1,750	1.17
Solano	1,392	546	5.923	979	2,103	196	5.485	3,588	1.53
Sonoma	2.270	1,797	9.787	4.650	4,076	527	5,685	6,577	1.16
Stanislaus	1,147	599	5,210	1,679	1,738	448	4,392	4.633	1.05
Sutter	332	289	1,243	524	1,114	341	1,143	1,033	1.11
Tehama	491	477	2.607	665	2.280	275	1,637	1,517	1.08
Trinity	231	187	767	116	448	73	732	140	5.23
Tulare	1,112	1.222	7,674	3,125	2,746	595	7,606	4,502	1.69
Tuolumne	526	328	1.561	367	791	168	1,140	565	2.02
Ventura	498	723	4,278	623	942	435	2,239	3,071	1.37
Yolo	893	409	3.213	777	1.413	168	1,572	2,924	1.86
Yuba	667	165	2,090	392	1.047	87	1,419	962	1.49
Totals	93,297	80 509	542,239	137,107	196,084	27,992	435,492	311.667	1.40

Total vote, 1910	173,805
Plurality for bonds	12,786
Total vote, 1916	679.346
Plurality for bonds	405,132
Total vote, 1919	224,289
Plurality for bonds	168,092

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Plate LIX. Proposed State Highway, Del Norte County, Before Construction, Showing Corduroy Road.



Plate LX. Weekend Campers Along State Highway in the Redwoods, Humboldt County.

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APPENDIX O.

ANALYSIS OF CEMENT PURCHASES, 1918, 1919, 1920.

ANALYSIS OF CEMENT PURCHASES IN YEAR 1918.

Contract Number	Date of Award	Quantity bid on	Delivery Points	1	2	3	4	5	6	7	8	9	Quantities Delivered	Mill Base	Cost at Mill
209 Ext.	Oct. 1	5300	Grass Valley	2.92	2.89*			1.63*+					5421	1.95	10570.95
210	June 7	20000	SanLuisObispo										16255	1.63	24495.65
214	Jan. 9	2210	Black Point	1.75	1.75*		1.77						1930	1.51	2914.30
215	Jan. 9	700	Willits	2.43	2.43*		2.45						721	1.50	1081.50
216	Jan. 9	18200	King City		2.10	1.95*							17951	1.45	26028.95
217	Jan.29	6570	La Mesa					1.81		1.61*			6735	1.04	7004.40
218	Mar. 14	10500	Santa Cruz	2.09		1.76*		1.90	2.00	1.71*	1.90		12543	1.70	21323.10
219	Mar. 14	200	El Cajon										160	1.18	188.80
220	Mar. 22	515	Eureka	2.24*	2.27								515	1.67	860.05
221	Mar. 22	3340	Oceanside	2.55					2.22	2.23	2.18*		3340	1.75	5845.00
222	Apr. 27	1500	Riverbank	2.20	2.27		2.23*						1874	2.00	3748.00
223	Apr. 24	4080	El Cajon					2.24*					3970	1.63	6471.10
224	June 13	1185	Fluma	2.46	2.46		2.46*						1419	1.63	2313.05
225	July 25	2430	Redding	2.57*	2.59	2.59							1900	1.97	3743.00
226	July 25	640	Westwood	3.39*	3.40	3.41							650	1.95	1267.00
227	July 25	10300	Oroville	2.38	2.38*	2.40							10999	1.98	21778.02
228	July 25	590	Valley Springs	2.40*	2.42	2.42							525	1.94	1018.50
229	July 25	4100	Gaviota					1.63*+				2.27	3915	1.63	6381.45
230	Aug. 21	18000	Irvington	2.30*	2.30	2.33							18745	1.96	36655.75
232	Aug. 21	620	Outlet	3.27	3.27*	3.45							619	1.96	1207.05
233	Aug. 21	16800	Bradley	2.57	2.78	2.55*						2.52	16316	1.95	31816.20
236	Mar. 28	14000	San Lucas		2.17	1.97*							17199	1.47	25282.53
D-114	May 28	2800	Aberdeen					1.63*+					6330	1.63	10317.90
D-173	Mar. 12	5000	Shingle Spgs.	2.00*		2.09							10390	1.77	18390.30
D-173	June 10	3500	Shingle Spgs.		2.17*								3422	1.95	6672.90
D-178	Jan. 29	54400	Castaic					1.61	1.825	1.505*	1.595		27464	1.09	29935.76
D-185	Feb. 26	320	Merced	1.91	1.90*		1.91						350	1.69	591.50
D-186	Apr. 10	1000	Upland					1.83*	1.895	2.45	2.03		1000	1.63	1630.00
D-196	Mar. 28	21000	Richvale		1.76*	1.85							15568	1.55	24130.40
D-208	Oct. 1	700	Longvale	3.30*	3.35								590	1.95	1150.50
D-210	Dec. 18	7000	Thermal					1.63*+					6975	1.63	11369.25
D-219	Aug. 21	800	Antler	2.80	2.80*	2.97							772	1.95	1505.40
WR-769-775	May 12	210	San Jose	1.91*		1.93							210	1.72	369.60
WR-782	Mar. 25	1400	Tinedale	2.04	2.04*								1427	1.70	2425.90
WR-813	June 12	230	Lankershim					1.63*+					230	1.63	374.90
WR-921	May 14	307	San Carlos	2.14	2.14*	2.14							307	1.95	598.65
WR-945	June 15	2700	Turlock	2.24	2.24*		2.24						2671	1.95	5208.45
TOTALS													221418	1.621	359035.76

*Successful bidder
+Mill base price
For key to bidders see "Analysis of Cement Purchases in Year 1919"

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ANALYSIS OF CEMENT PURCHASES IN YEAR 1919.

Contract Number	Date of Award	Quantity bid on	Delivery Points	1	2	3	4	5	6	7	8	9	Quantities Delivered	Mill Base	Cost at Mill
191	July 23	11600	Zamora		2.47*								11183	2.09	23372.47
191	June 7	11600	Zamora	2.47*	2.48	2.48	2.48						1820	2.09	3803.80
220	Dec. 12	630	Eureka		1.95*+								494	1.95	963.30
237	Mar. 20	385	Saugus	2.84				1.95+*		1.95+			380	1.95	741.00
239	Apr. 15	1000	Paso Robles		2.75	2.52*		1.95+					762	1.95	1485.90
240	Mar. 20	1600	Eureka	2.62	1.95*+	2.62							1540	1.95	3003.00
241	Mar. 25	2800	Redding		1.95*+	2.63							1921	1.95	3745.95
242	June 6	1950	Redding	2.78*	2.78								922	2.10	1936.20
243	June 6	5600	Glenwood		2.59	2.42*							5849	2.10	12282.90
244	June 25	6110	King City	2.67	2.90	2.67*	2.67	2.10+	2.10+			2.67	6032	2.10	12667.20
245	June 25	23400	Coalinga	2.86	2.86	2.86	2.86	2.10+	2.10+	2.86*	2.10+	2.86	23944	2.00	47888.00
246	June 25	24600	Merced	2.59	2.59*	2.59	2.59	2.10+	2.10+			2.89	15069	2.10	31644.90
247	July 10	650	Hopland		2.82	2.82	2.82*					2.82	543	2.10	1140.30
248	June 25	600	Crescent City	3.53	3.53*	3.53	3.53						430	2.10	903.00
249	June 25	100	Trinidad	3.99	3.99*	3.99	3.99						100	2.10	210.00
250	Aug. 25	4025	Saugus					2.05*+	2.51	2.51	2.51		3750	2.05	7687.50
251	Sept.16	2768	Los Nogales					2.59*	2.61	2.61	2.61		2910	2.075	6038.25
252	Sept.16	7648	El Toro					2.46*	2.48	2.48	2.48		6235	2.025	12626.88
253	Sept.16	480	Hopland		2.82*	2.82							471	2.10	989.10
254	Sept.16	20360	Oakdale		2.51	2.51*		2.52				2.518	13281	2.092	27783.85
255	Sept.16	5760	Divide		3.18	3.18		3.16*	3.18	3.18	3.18	3.18	6470	2.04	13198.80
256	Oct. 22	8184	Acampo	2.40	2.40	2.40*						2.40	8504	2.02	17178.08
257	Nov. 12	2560	Camarillo					2.72*	2.74	2.74	2.74		3071	2.075	6372.33
258	Oct. 22	19136	Acton	2.72				2.67	1.95+	2.67	2.56*		1035	1.82	1883.70
259	Nov. 8	416	Martell	2.93	2.93*	2.93						2.93		2.10	
260	Dec. 3	7200	Ensign	2.62	2.63*	2.63							9599	2.10	20157.90
261	Nov. 10	11200	Camarillo					2.72*	2.74	2.74	2.74		5945	2.075	12335.88
262	Dec. 3	988	Beaumont	3.24				2.09*+	1.96+	2.51	2.51		1054	2.09	2202.86
263	Dec. 3	336	Campo					2.84*	2.04+	2.10+	3.12		450	1.814	816.30
264	Dec. 3	584	Campo					2.84*	2.04+	2.10+	3.12		250	1.814	453.50
D-154	Aug. 28	314	Nevada City		2.10*+								314	2.10	659.40
D-195	Aug. 7	960	Longvale		2.10*+								914	2.10	1919.40
D-214	Dec. 3	4500	Westmoreland					2.84*	2.00+	2.10+	3.12		2895	1.814	5251.53
D-214	Feb. 18	10000	Westmoreland					1.95+		1.95*+			13870	1.95	27046.50
D-217	Mar. 26		Lancaster							1.86*	(Contin.	D-178)	20740	1.09	22606.60
D-220	Mar. 28	2400	Rocklin	2.31	2.31*		2.31						2275	1.95	4436.25
D-223	May 13		Seeley					2.10**					960	2.10	2016.00
D-225	Apr. 9		West Napa		1.95**								4001	1.95	7801.95
D-227	Apr. 18	1280	Indio					1.95*+					1280	1.95	2496.00
D-230	July 10	2700	San Ardo	2.67	2.90	2.67	2.67					2.67*	2310	2.10	4851.00
D-231	Mar. 20	18100	Campo	3.36				1.95+	1.893*+	1.95+	1.893+		11100	1.893	21012.30
D-232	June 3		Weed		2.10**								525	2.10	1102.50
D-233	July 10	2400	Alto	2.46	2.46	2.46	2.46*						2466	2.10	5178.60
D-236	June 6	720	Alturas		3.84*	3.84							243	2.10	510.30
D-239	Dec. 18	1200	Turner Sta.	2.46	2.46*	2.46						2.50	1224	2.10	2570.40

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ANALYSIS OF CEMENT PURCHASES IN YEAR 1919—Continued.

Contract Number	Date of Award	Quantity bid on	Delivery Points	1	2	3	4	5	6	7	8	9	Quantities Delivered	Mill Base	Cost at Mill
D-240	Sept.16	2000	Banta	2.40	2.10*+	2.40						2.40	5052	2.10	10609.20
D-244	Aug. 1		Merced		2.10**								320	2.10	672.00
D-247	Oct. 28	2540	Loomis	2.46	2.46	2.46*						2.47	1765	2.10	3706.50
D-248	Sept.16	1230	Orella					2.97	2.03*+	2.97	2.97		1765	2.03	3582.95
D-249	Aug. 25	23360	Bakersfield	2.80	2.84	2.80	2.80	1.99*+	2.80	2.80	2.80	2.86	10750	1.99	21392.50
D-252	Nov. 8	800	Proberta	2.66	2.67*	2.67						2.10+	236	2.10	495.60
D-261	Oct. 2	910	Nevada City	3.09	3.09*	3.09							1042	2.10	2188.20
D-264	Nov. 4	3200	Coyote	2.41	2.42	2.42						2.10*+	3508	2.10	7366.80
D-265	Oct. 4	1152	Visalia	2.82	2.82	2.82		2.82	2.82*	2.82		2.82	2530	2.06	5211.80
D-267	Nov. 25	180	Lankershim					2.59*					180	2.08	374.40
D-268	Nov. 10		Fruitvale		2.10*+								660	2.10	1386.00
D-285	Nov. 18		Petaluma		2.10*+								245	2.10	514.50
MR-924	May 13	655	Oceanside					1.63*+					655	1.63	1067.65
MR-957	June 6	160	Modesto		2.43*								160	1.94	310.40
MR-953	Jan. 24	475	Montalvo					2.61	2.59*	2.61				1.847	
MR-964	Mar. 29	640	Camarillo					1.95*+					800	1.95	1560.00
MR-988	Mar. 24		Fresno		1.95*+								175	1.95	341.25
MR-1016	Feb. 4	2000	Turlock		2.38*								2016	1.94	3911.04
MR-1045	Mar. 24		Hanford		1.95*+								241	1.95	469.95
MR-1047	Mar. 19	5680	Castaic							2.146*	(Cont. D-178)		7335	1.09	7995.15
MR-1053	May 1		Bakersfield		1.95*+								418	1.95	815.10
MR-1056	Apr. 3		San Jose		1.95*+								175	1.95	341.25
MR-1064	Apr. 25		Crockett		1.95*+								175	1.95	341.25
MR-1097	June 25	1490	Delano	2.10	2.10*+	2.84	2.84	2.10+	2.10+	2.86	2.10+	2.84	1490	2.10	3129.00
MR-1123	July 23		Sacramento		2.10*+								407	2.10	854.70
MR-1124	July 15		San Jose		2.10*+								175	2.10	367.50
MR-1126	Dec. 16		Merced		2.10*+								175	2.10	367.50
TOTALS													241581	1.922	464342.77

* Successful bidder
\+ Mill base price
* Emergency purchase; competitive bids not taken

	NAME	LOCATION OF MILL	ADDRESS
1	Henry Cowell Lime & Cement Company	Cowell	#2 Market St., San Francisco, Calif.
2	Pacific Portland Cement Company	Cement	Pacific Bldg., San Francisco, Calif.
3	Santa Cruz Portland Cement Co.,	Davenport	Crocker Bldg., San Francisco, Calif.
4	Standard Portland Cement Company	Napa Junction	Crocker Bldg., San Francisco, Calif.
5	Calif. Portland Cement Company	Colton	Douglas Bldg., Los Angeles, California
6	Golden State Portland Cement Co.	Oro Grande	Marsh-Strong Bldg., Los Angeles, Calif.
7	Riverside Portland Cement Company	Crestmore	Title Insurance Bldg., Los Angeles, Calif.
8	Southwestern Portland Cement Co.	Victorville	H. W. Hellman Bldg., Los Angeles, Calif.
9	Old Mission Portland Cement Co.	San Juan Bautista	Mills Bldg., San Francisco, California.

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ANALYSIS OF CEMENT PURCHASES IN YEAR 1920.

Contract Number	Date of Award	Quantity bid on	Delivery Points	1	2	3	4	5	6	7	8	9	Quantities Delivered	Mill Base	Cost at Mill
226	Apr. 12	240	Bunnell	3.50	3.50	3.50*							422	2.10	886.20
261	May 24	2320	Camarillo							3.31**			2320	2.65	6148.00
265	Apr. 1	160	Kearsarge					2.40+	3.18*	3.48	3.41		230	2.10	483.00
267	Feb. 26	24530	Mecca					1.85*+	2.00+	1.88+	2.82		5135	1.85	9499.75
268	Apr. 27	23000	Ronda		2.48	2.48*								1.85	
269	Apr. 27	18480	Lakeside					3.16*		2.40+	3.21			2.35	
270	Apr. 27	26575	Glenwood		2.59	2.42*								2.10	
D-196	Apr. 10	15436	Nelson	2.63	2.63*	2.63							11701	2.10	24572.10
D-208	Feb. 21		Longvale		2.10*+								173	2.10	363.30
D-229	May 11	850	Soledad		2.90*	2.97	2.97							2.10	
D-238	Jan. 19	5000	Manteca	2.44	2.44*	2.44							5529	2.10	11610.90
D-269	Apr. 21	670	South Fork		3.67	3.67*	3.67						432	2.10	907.20
D-275	Apr. 27	11900	South Bay	2.76	2.76*	2.76	2.76						2085	2.10	4378.50
D-286	Jan. 21	4000	Riverbank	2.48	2.48	2.48*							3812	2.10	8005.20
D-288	Feb. 9	1650	Jacumba						1.893*+	Contin. D-231			1556	1.893	2943.62
D-290	Mar. 3		Willits		2.10*+								242	2.10	508.20
D-294	Mar. 20	226	El Portal		2.10*+								226	2.10	474.60
D-297	Feb. 6		Mirimar Siding					2.69	1.85*+	2.72	2.70		175	1.85	323.75
D-298	Feb. 17	160	Oceanside					2.08+	2.46*	2.56	2.55		170	1.87	317.90
D-301	Mar. 13	247	Willits		2.10*+								247	2.10	518.70
D-304	Feb. 26	14020	Mecca					1.85*+	2.00+	1.88+	2.82		3455	1.85	6391.75
D-314	Jun. 9	250	Doherty Sta.		2.72*	2.81							250	2.40	600.00
D-322	Apr. 27	1560	Gaviota		3.12	3.12*	3.12	3.31		2.40+			231	2.10	485.10
D-324	Apr. 27	1625	Summerland		2.95			2.95*		2.40+	3.00		245	2.35	575.75
D-325	May 11	3800	Madrone		2.51*	2.72	2.72						1067	2.10	2240.70
D-333	May 11	1800	Strader		2.87	3.17	3.17	2.40+	2.86*	2.40+	3.16		440	2.10	924.00
D-334	June 9	3100	Belmont		2.72*	2.77								2.40	
D-338	June 2	336	Altamont		2.74*	2.79								2.40	
MR-1215	Mar. 13	302	Merced		2.10*+								652	2.10	1369.20
MR-1225	May 28	200	Petaluma		2.78*	No bid						No bid	200	2.50	500.00
MR-1254 MR-1274	June 28	160	Lankershim					3.17		3.17	2.91*			2.35	
MR-1251 MR-1262	Apr. 13	475	Merced	2.59	2.59	2.59*	2.59					2.59	244	2.06	502.64
MR-1284	May 5	340	San Pablo		2.10*+								340	2.10	714.00
MR-1270	June 22	244	Willows		2.40*+								244	2.40	585.60
MR-1274	June 10	160	Castiac					3.04		2.65+	3.04*		160	2.28	364.80
MR-1276	Apr. 19	1960	Owensmouth		3.12			2.90*		2.40+	2.98		1066	2.35	2505.10
MR-1277	June 4	205	Madrone		2.40*+									2.40	
TOTALS													43048	2.083	89699.56

* Successful bidder
\+ Mill base price
* Emergency purchase; competitive bids not taken
For key to bidders see "Analysis of Cement Purchases in Year 1919".

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Appendix P.

APPORTIONMENT OF RECEIPTS OF STATE MOTOR VEHICLE DEPARTMENT.

(*a*) Period June 30, 1918–December 31, 1918. Inclusive.
(*b*) Period January 1, 1919–June 30, 1919. Inclusive.
(*c*) Period June 30, 1919–December 31, 1919. Inclusive.
(*d*) Period January 1, 1920–July 31, 1920.

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STATE MOTOR VEHICLE DEPARTMENT OF CALIFORNIA.

SEMI ANNUAL STATEMENT OF APPORTIONMENT OF RECEIPTS FOR THE PERIOD JUNE 30-1918 to DEC. 31-1918 incl.

	AUTOMOBILES	MOTORCYCLES	AUTO DEALERS	M/C DEALERS	SUBSTITUTIONS	TRAILERS	TOTAL OF GROSS RECEIPTS	REFUNDS	NET TOTAL	EXPENSE	NET TOTAL FOR DISTRIBUTION	COUNTIES & STATE SHARE: EACH
Alameda	16781.82	611.30	80.75	7.50	3382.80	5.00	20869.17	3232.20	17636.97	14123.80	3513.17	1756.58
Alpine	21.30						21.30	2.00	19.30	15.46	3.84	1.92
Amador	372.85	7.25			47.80		427.90	40.40	387.50	310.32	77.18	38.59
Butte	2803.00	41.75	18.75		457.58	9.90	3330.98	437.00	2893.98	2317.52	576.46	288.23
Calaveras	421.15	4.55			56.10		491.80	34.85	456.95	365.94	91.01	45.51
Colusa	1311.50	4.15		2.50	217.60	4.00	1539.75	217.70	1322.05	1038.70	283.35	141.67
Contra Costa	2846.30	97.30	18.75	2.50	481.65		3547.10	422.35	3124.75	2502.32	622.43	311.22
Del Norte	209.35	.80			8.90		218.75	16.70	202.05	161.80	40.25	20.12
El Dorado	424.80	5.00			37.10		466.60	40.70	425.90	341.06	84.84	42.42
Fresno	13661.00	486.50	159.50	8.75	3435.45	7.00	17688.20	2527.20	15161.00	12141.02	3019.98	1509.99
Glenn	1638.35	36.45	20.68	3.75	332.80	7.00	1938.85	195.20	1743.65	1396.32	347.33	173.67
Humboldt	2385.45	53.55	37.50		326.60		2803.10	263.15	2539.95	2032.42	506.53	253.26
Imperial	5219.03	36.10	31.25	2.00	1033.15		6321.53	734.25	5587.28	4522.38	1124.90	562.45
Inyo	1199.20	3.00	31.25		112.55		1306.05	82.95	1223.10	979.46	243.64	121.82
Kern	6655.28	160.65	43.75		1518.75	3.00	8381.43	1179.55	7201.88	5767.32	1434.56	717.28
Kings	2173.95	38.80	41.25		573.30		2827.30	231.20	2596.10	2078.98	517.12	258.56
Lake	413.60	3.25	12.50		43.70		437.05	42.00	431.05	345.18	85.87	42.94
Lassen	669.45	8.50	12.50		71.95		762.40	77.30	685.10	548.64	136.46	68.23
Los Angeles	64356.79	2226.15	639.50	10.00	17854.68	170.75	85119.87	19972.16	65147.69	52271.50	12876.19	6438.09
Madera	988.70	29.25	27.00		206.20		1253.15	162.60	1090.55	873.32	217.23	108.62
Marin	1151.90	25.25	12.50		154.15		1343.80	164.70	1179.10	944.24	234.86	117.43
Mariposa	171.45		12.50		17.40		201.35	37.40	163.95	131.30	32.65	16.32
Mendocino	1573.55	15.65	25.00		130.90		1745.20	216.25	1528.95	1224.60	304.35	152.17
Merced	2136.65	32.40	31.25	1.00	384.15		2584.65	212.55	2372.10	1899.60	472.50	236.26
Modoc	843.25	2.50		2.50	54.70		902.95	47.70	855.25	684.90	170.36	85.17
Mono	84.65				4.60		89.25	4.60	84.65	67.78	16.87	8.44
Monterey	1729.70	33.35	12.50		287.35		2062.90	236.45	1826.45	1463.45	364.00	182.00
Napa	1097.65	48.15	25.00		176.30		1307.10	157.50	1149.60	920.60	229.00	114.50
Nevada	506.35	8.30			54.45		569.10	70.90	498.20	398.96	99.24	49.62
Orange	4591.85	242.55	43.75		1543.90	13.75	6435.80	898.10	5537.70	4434.62	1103.08	551.54
Placer	1426.98	28.20			299.55		1754.73	111.85	1642.88	1315.64	327.24	163.62
Plumas	667.30	3.30			99.25		769.85	33.60	736.25	477.49	118.77	59.38
Riverside	3691.27	197.06	56.25	2.50	863.45	5.00	5015.53	727.46	4288.07	3368.86	919.21	459.61
Sacramento	5541.97	188.45	20.75		1624.00	5.50	7790.57	1315.95	6474.62	5176.90	1297.72	648.86
San Benito	687.80	27.55			105.40	4.00	824.45	50.50	773.95	619.78	154.17	77.08
San Bernardino	4770.85	263.30	18.75		1229.33	8.00	6290.23	1014.40	5275.83	4224.92	1050.91	525.46
San Diego	9107.65	276.50	79.75	5.00	2104.52		11672.92	2056.35	9506.17	7612.50	1893.67	946.78
San Francisco	24404.45	508.90	264.50	5.00	5304.50	10.00	30394.35	6103.75	24290.60	19452.08	4838.52	2419.26
San Joaquin	7856.05	194.65	62.50	2.50	1249.20	46.50	9111.40	1113.36	7998.05	6404.90	1593.15	796.58
San Luis Obispo	1530.55	21.30	37.50		282.80		1872.15	276.85	1596.30	1277.52	317.78	158.89
San Mateo	2382.00	99.95	25.00		370.75		2877.70	299.20	2588.50	2072.88	515.62	257.81
Santa Barbara	3562.85	72.60	62.50		1020.00	2.00	4739.70	667.90	4072.70	3261.44	811.26	405.63
Santa Clara	6927.70	265.80	62.50	5.00	1492.50	57.00	8963.50	1358.35	7605.20	6090.22	1514.98	757.49
Santa Cruz	1709.40	50.15	18.75		236.85		2015.15	333.80	1681.35	1346.44	334.91	167.45
Shasta	1297.30	14.90	12.50		209.25		1533.95	129.65	1404.30	1124.58	279.72	139.86
Sierra	230.90				11.85		242.75	25.40	217.35	174.06	43.29	21.65
Siskiyou	1605.35	940.00	25.00		98.65		1738.40	124.80	1613.60	1292.18	321.42	160.71
Solano	2963.88	78.75	25.00		396.30		3473.93	427.65	3046.28	2439.48	606.80	303.40
Sonoma	4207.40	102.70	24.75	2.00	512.45		4656.30	656.70	3999.60	3202.90	796.70	398.35
Stanislaus	5842.30	131.10	54.00	2.50	976.00	3.00	6410.90	710.35	5700.55	4564.94	1135.61	567.80
Sutter	798.40	18.10			239.25	1.00	1056.75	65.60	991.15	793.72	197.43	98.72
Tehama	1041.35	24.80			270.75		1336.90	132.70	1204.20	964.94	239.26	119.63
Trinity	198.90	2.50			8.00		209.40	6.60	202.80	162.40	40.40	20.20
Tulare	5833.60	136.80	45.75	4.00	1114.30		7136.45	734.05	6402.40	5127.08	1275.32	637.66
Tuolumne	634.85	9.75			32.50		677.20	71.20	606.00	485.30	120.70	60.35
Ventura	2752.75	34.85	44.65		872.00	10.00	3714.25	360.50	3353.75	2685.70	668.05	334.02
Yolo	1861.90	31.75	37.50		427.80	2.00	2060.96	234.00	1826.95	1463.04	363.91	181.96
Yuba	1018.15	19.30	27.00		172.20	1.00	1237.65	106.35	1131.30	905.96	225.34	112.67
TOTALS	242074.37	7024.15	2300.90	57.50	54474.16	386.90	306317.98	50256.53	256051.45	205047.65	51003.80	25501.90

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STATE MOTOR VEHICLE DEPARTMENT OF CALIFORNIA.

SEMI ANNUAL STATEMENT OF APPORTIONMENT OF RECEIPTS FOR THE PERIOD Jan. 1 - 1919 to June 30 - 1919 incl.

	AUTOMOBILES	MOTORCYCLES	AUTO DEALERS	M/C DEALERS	SUBSTITUTIONS	TRAILERS	TOTAL OF GROSS RECEIPTS	REFUNDS	NET TOTAL	EXPENSE	NET TOTAL FOR DISTRIBUTION	COUNTY & STATE SHARE: EACH
Alameda	268429.98	3580.45	3599.25	83.75	5889.40	72.00	281624.83	7445.60	274179.23	14846.84	259332.39	129666.19
Alpine	137.60				50		138.10		138.10	7.48	130.62	65.31
Amador	6107.35	26.15	125.00		100.95		6359.45	61.80	6297.65	341.02	5956.63	2978.32
Butte	36809.50	253.20	749.50	17.80	730.60	29.00	38589.60	954.35	37645.25	2038.50	35606.75	17803.37
Calaveras	5136.65	31.75	50.00		92.40		5310.80	37.55	5273.25	285.54	4987.71	2493.86
Colusa	17082.00	72.25	553.50	5.00	371.75	8.50	18093.00	302.20	17790.80	963.38	16827.42	8413.71
Contra Costa	42411.90	605.90	748.75	15.00	998.30		44779.85	915.60	43864.25	2376.82	41488.99	20744.49
Del Norte	1871.45	4.00	50.00		5.70		1931.15	23.80	1907.35	103.28	1804.07	902.04
El Dorado	5454.65	25.40	100.00		79.30		5659.35	70.90	5588.40	302.62	5285.78	2642.89
Fresno	188903.15	1806.90	3546.00	48.75	5185.95	32.00	199522.75	4275.20	195247.55	10972.68	184674.87	92337.43
Glenn	19895.47	131.30	413.00	10.00	631.30	25.00	21106.07	312.35	20793.72	1125.98	19667.74	9833.87
Humboldt	31436.50	292.85	713.30	5.00	854.45	6.00	33048.10	887.00	32491.10	1759.40	30731.70	15365.85
Imperial	57588.73	130.75	1320.00		1523.30	14.00	60576.78	1461.20	59115.58	3201.12	55914.46	27957.23
Inyo	9243.43	8.00	237.50		112.15	3.50	9604.58	218.90	9385.68	508.24	8877.44	4438.72
Kern	90058.02	884.40	1213.80	15.00	2374.93	34.50	94580.65	2457.35	92123.30	4988.50	87134.80	43567.40
Kings	33198.30	111.30	703.50	3.75	978.55	26.00	35021.40	416.10	34605.30	1873.88	32731.42	16365.71
Lake	5971.95	16.00	145.75		128.05		6261.75	110.30	6151.45	333.10	5818.35	2909.18
Lassen	6109.33	17.15	110.00		121.60		6358.08	90.30	6267.78	339.40	5928.38	2964.19
Los Angeles	1090499.33	12433.35	15936.90	160.75	26929.43	864.50	1146824.26	25978.20	1120846.06	59652.10	1061193.96	530596.98
Madera	14439.85	161.00	212.50	5.00	380.45		15198.80	302.50	14896.30	809.68	14142.92	7071.46
Marin	20992.85	178.35	339.50	5.00	449.85	8.00	21873.55	413.70	21459.85	1162.05	20297.80	10148.90
Mariposa	1458.85	11.00	43.75		14.30		1527.90	17.95	1509.95	135.92	1374.03	1187.01
Mendocino	16145.95	60.75	397.75		210.65	2.00	16817.10	247.60	16569.50	897.24	15672.26	7835.13
Merced	27745.30	189.85	667.50		602.30	6.00	29231.00	470.40	28760.60	1597.40	27203.20	13601.60
Modoc	6154.40	9.50	139.50		52.45		6355.85	68.50	6287.35	340.46	5946.89	2973.45
Mono	405.50	2.50			15.00		423.00	4.40	418.60	22.66	395.94	197.97
Monterey	30235.30	161.60	595.50	8.75	492.40	12.00	31527.53	516.40	31011.15	1679.22	29331.89	14665.94
Napa	20449.15	216.85	331.25	10.00	340.85	2.00	21350.10	407.90	20942.20	1134.02	19808.18	9904.09
Nevada	6385.45	20.75	124.50		93.00		6623.70	64.10	6479.60	350.82	6128.78	3064.39
Orange	92792.75	1399.10	1570.25	38.75	2016.35	128.00	97945.20	2341.75	95603.45	5176.94	90426.51	45213.26
Placer	18747.00	126.60	389.50	5.00	410.05		19678.15	367.45	19310.70	1045.68	18265.02	9132.51
Plumas	3939.70	12.65	87.50		26.30	2.00	4097.15	66.10	4031.05	218.28	3812.77	1906.38
Riverside	58093.71	965.50	1083.25	30.00	1255.30	34.50	61462.26	1393.45	60068.81	3382.74	56686.07	28408.04
Sacramento	103516.75	1110.30	1825.00	15.00	2037.90	31.50	108536.45	3251.10	105285.35	5754.82	100530.53	50260.26
San Benito	11772.65	77.50	249.75	5.00	244.75	2.00	12351.65	133.85	12217.80	661.80	11556.00	5778.10
San Bernardino	80228.93	1466.35	1486.25	43.75	1628.90	60.50	84914.68	2093.30	82821.38	4484.80	78336.58	39168.29
San Diego	122235.60	1340.80	1961.50	42.50	2641.80		128222.25	4217.35	124004.90	6714.88	117290.12	58645.06
San Francisco	402032.40	2998.45	6082.50	56.25	8422.85	68.50	419660.90	13916.20	405734.76	21970.64	383764.16	191882.08
San Joaquin	103093.70	908.55	1890.25	35.00	2208.90	94.00	108230.40	2484.25	105746.15	5726.16	100019.99	50010.00
San Luis Obispo	26861.56	135.55	462.50		466.35	4.00	27919.95	417.70	27502.25	1489.26	26012.99	13006.49
San Mateo	34324.67	456.95	418.75	15.00	602.60	4.00	35821.97	589.25	35232.72	1907.86	33324.86	16662.43
Santa Barbara	29273.38	352.70	1131.92	15.00	1338.75	10.00	32161.27	1458.50	30702.77	1663.22	29039.55	14519.77
Santa Clara	119648.85	1113.15	2018.25	41.25	2404.25	160.80	125000.55	2749.20	122251.35	6624.36	115626.99	57813.49
Santa Cruz	27378.90	241.50	725.50	13.75	435.45	4.00	28799.20	451.65	28347.55	1535.01	26812.54	13406.27
Shasta	13195.40	71.30	380.75	5.00	298.50		13950.95	200.70	13720.25	742.96	12977.29	6488.65
Sierra	1457.35		35.00		9.90		1502.25	24.90	1477.35	80.00	1397.35	698.67
Siskiyou	14409.25	43.65	355.00		200.35		15008.25	197.90	14810.35	801.98	14008.37	7004.19
Solano	34481.20	387.55	656.75	5.00	649.10		36179.60	879.15	35300.45	1911.52	33388.93	16694.46
Sonoma	57184.45	454.30	1326.75	15.00	1258.35	4.00	60242.85	1178.15	59064.70	3198.42	55866.28	27933.14
Stanislaus	75140.55	626.30	1444.75	30.00	1517.33	35.00	78793.94	1467.35	77326.59	4187.24	73139.15	36569.58
Sutter	13427.30	55.50	43.75		259.35	2.00	13787.90	105.35	13682.55	740.92	12941.63	6470.81
Tehama	11159.10	106.10	426.00	5.00	432.65	4.00	12131.85	240.30	11891.55	644.14	11247.41	5623.71
Trinity	916.00	9.00	22.00		13.05		961.05		961.05	52.04	909.01	454.50
Tulare	87097.43	613.45	1551.30	10.00	2179.15	44.25	91496.58	1704.05	89791.53	4863.22	84929.31	42464.66
Tuolumne	6986.40	21.25	93.75		82.95		7184.35	109.60	7074.75	383.10	6691.65	3345.82
Ventura	39159.86	208.85	709.25	5.00	1149.40	38.75	41271.10	587.20	40683.90	2197.62	38486.28	19193.14
Yolo	28871.55	203.95	476.25	5.00	576.45	24.00	30177.20	448.65	29728.55	1609.80	28118.75	14059.38
Yuba	12853.56	53.20	434.50		332.50	6.00	14087.56	269.85	13817.71	748.24	13069.47	6534.74
TOTALS	3727888.90	37397.20	62498.70	829.80	85505.40	1908.50	3916028.50	109819.05	3806209.45	206106.83	3600102.62	1800051.31

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STATE MOTOR VEHICLE DE PARTMENT OF CALIFORNIA.

SEMI ANNUAL STATEMENT OF APPORTIONMENT OF RECEIPTS FOR THE PERIOD JUNE 30 - 1919 to Dec. 31 - 1919 incl

	AUTOMOBILES	MOTORCYCLES	AUTO DEALERS	M/C DEALERS	SUBSTITUTIONS	TRAILERS	TOTAL OF GROSS RECEIPTS	REFUNDS	NET TOTAL	EXPENSE	NET TOTAL FOR DISTRIBUTION	COUNTIES & STATE SHARE: [illegible]
Alameda	28372.40	766.20	362.50	2.50	5885.70	36.00	35095.30	4556.20	30439.10	13674.00	16868.10	8432.89
Alpine	9.30						9.30	4.40	4.90	2.18	2.72	1.36
Amador	533.20	1.00			83.55		617.75	82.50	535.25	238.67	296.58	148.29
Butte	4197.35	71.30	118.75		1015.60	41.50	5444.50	656.50	4787.70	2136.02	2651.68	1325.84
Calaveras	504.55	3.00			103.65		611.20	36.70	574.50	256.16	318.34	159.16
Colusa	2201.00	19.65	37.25		495.30	28.50	2781.70	141.15	2640.55	1177.33	1463.02	731.51
Contra Costa	4615.20	150.45	120.25		886.25	2.00	5774.15	698.65	5075.50	2257.92	2817.58	1408.80
Del Norte	353.90				4.10		358.00	12.50	345.50	153.98	191.52	95.76
El Dorado	526.85	7.25			76.60		612.70	75.60	537.10	239.50	297.60	148.80
Fresno	21763.50	396.25	328.25	5.00	5569.20	61.00	28123.20	2965.05	25158.15	11219.02	13939.13	6969.56
Glenn	2375.75	26.50	39.50		519.10	20.00	2980.85	268.40	2712.45	1209.58	1502.87	751.44
Humboldt	3977.55	62.95	56.00		696.50	2.50	4797.50	352.70	4444.80	1982.10	2462.70	1231.36
Imperial	8678.07	29.90	128.00		1739.50	18.00	10693.47	1097.60	9595.87	4254.57	5341.30	2670.65
Inyo	1054.60	1.50			146.10		1202.20	109.00	1093.20	487.50	605.70	302.85
Kern	10047.85	162.60	141.50		2311.65	24.00	12687.60	1768.40	10919.20	4869.30	6049.90	3024.95
Kings	3815.75	42.80	54.00	1.25	984.65	42.00	4940.45	402.60	4537.85	2023.60	2514.25	1257.11
Lake	738.65	8.50	6.25		91.30		844.90	70.00	774.90	345.54	429.36	214.68
Lassen	996.65	9.40			140.10	4.00	1150.15	85.50	1064.65	474.76	589.89	294.95
Los Angeles	120395.60	2341.15	2078.00	18.75	29140.90	383.00	154357.40	25616.75	128740.65	57438.17	71302.48	35652.74
Madera	1493.25	38.05	31.25		354.00	4.00	1920.55	160.25	1760.30	784.96	975.34	487.67
Marin	1914.80	38.80	50.00		347.45		2351.05	207.85	2143.20	956.72	1187.48	593.74
Mariposa	210.40				19.80		230.20	21.20	209.00	93.20	115.80	57.90
Mendocino	2077.95	20.30	56.25		310.60	2.00	2467.10	169.55	2297.55	1024.55	1273.00	636.50
Merced	3681.40	51.05	79.00		755.00	6.00	4582.45	303.85	4278.60	1909.36	2370.62	1185.31
Modoc	556.15	11.50	12.50		60.30		640.45	89.25	551.20	229.18	322.02	161.01
Mono	138.55				5.00		143.55		143.55	64.00	79.55	39.78
Monterey	3165.05	53.85	57.50		601.70	6.00	3884.10	305.10	3579.00	1596.00	1983.00	991.50
Napa	1961.65	27.35	25.00		434.80		2478.70	246.95	2231.75	995.41	1236.34	618.17
Nevada	1583.90	17.25	24.00		149.00		1774.15	82.65	1691.50	754.46	941.04	470.52
Orange	8475.37	255.65	153.50		2572.45	68.00	11524.97	1251.75	10273.22	4581.12	5692.00	2846.00
Placer	2038.45	34.80	31.25		419.80	2.00	2526.30	287.15	2239.15	1007.43	1231.72	615.86
Plumas	661.55	3.25			53.35		718.15	57.05	661.10	294.80	366.30	183.15
Riverside	6042.20	177.65	87.50		1492.45	32.00	7831.80	836.45	6995.35	3119.50	3875.85	1937.92
Sacramento	11052.60	194.15	248.25		2549.10	30.50	14074.60	2015.10	12059.50	5377.80	6681.70	3340.85
San Benito	1182.10	16.50	6.25		235.55	6.00	1416.40	104.60	1311.80	584.98	726.82	363.41
San Bernardino	8433.80	317.25	133.75		1858.15	54.00	10806.95	1388.85	9418.10	4199.90	5218.20	2609.10
San Diego	12844.30	348.35	293.25	2.50	3024.10	8.00	16480.50	2011.55	14468.95	6451.14	8017.81	4008.90
San Francisco	42811.65	932.45	892.50		7795.40	60.00	51702.75	4800.00	46902.75	19532.27	24370.48	12185.24
San Joaquin	11747.60	238.80	312.25	1.25	2636.90	64.00	15000.80	1689.65	13311.15	5936.95	7375.20	3687.60
San Luis Obispo	2999.75	26.25	81.25		466.50	4.00	3577.75	309.55	3268.20	1457.42	1810.78	905.39
San Mateo	3184.65	110.40	97.50		500.60	10.50	3843.65	390.20	3453.45	1540.03	1913.42	956.71
Santa Barbara	5228.80	94.10	72.75		1359.30	4.00	6758.95	962.35	5796.60	2584.80	3211.80	1605.75
Santa Clara	12475.35	369.70	268.25	2.50	2443.15	142.50	15699.45	1762.30	13937.25	6215.13	7722.10	3861.05
Santa Cruz	3347.50	60.40	50.00		454.70	12.00	3964.60	346.10	3618.50	1613.62	2004.88	1002.44
Shasta	1680.45	24.90	10.00		397.00	2.00	2114.35	132.55	1981.80	883.74	1098.06	549.03
Sierra	160.25	1.50			11.00		172.75	16.30	156.45	69.75	86.70	43.35
Siskiyou	2018.25	11.00	25.00		269.40		2313.65	207.00	2106.65	939.40	1167.25	583.80
Solano	4761.10	112.50	50.00		783.10	46.00	5746.70	600.20	5146.50	2295.02	2851.48	1425.74
Sonoma	6598.70	128.65	174.75	2.50	1345.05	21.50	8268.15	679.60	7588.55	3384.03	4204.52	2102.26
Stanislaus	8217.93	179.45	106.25		1686.70	62.00	10251.33	947.00	9304.33	4149.17	5155.16	2577.58
Sutter	1563.25	29.95	12.50		478.90	8.00	2092.60	122.30	1970.30	878.62	1091.68	545.84
Tehama	1761.70	37.60		1.70	515.25	4.00	2311.25	209.15	2102.80	937.76	1165.10	582.55
Trinity	113.40	1.50			10.70		125.60	10.00	115.60	51.54	64.06	32.03
Tulare	9641.00	163.30	187.50	1.25	2326.60	33.00	12352.65	1061.65	11190.80	4990.42	6200.38	3100.19
Tuolumne	538.45	2.00	12.50		79.15		632.10	88.50	533.60	237.94	296.66	147.83
Ventura	3788.45	82.60	93.75	1.25	1332.55	46.50	5345.10	426.85	4918.25	2193.23	2725.02	1362.51
Yolo	2736.75	34.45	36.25	2.50	761.90	21.00	3592.85	303.45	3289.40	1467.34	1822.06	911.03
Yuba	1780.30	12.00	62.50		462.40	4.00	2321.20	284.05	2037.15	908.95	1128.20	564.10
TOTALS	408647.87	8008.65	6845.25	45.95	90849.30	1418.00	515814.72	67314.25	448500.47	200003.55	248496.92	124248.46

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STATE MOTOR VEHICLE DEPARTMENT OF CALIFORNIA.

SEMI ANNUAL STATEMENT OF APPORTIONMENT OF RECEIPTS FOR THE PERIOD Jan. 1 - 1920 to July 31-1920 incl

	AUTOMOBILES	MOTORCYCLES	AUTO DEALERS	M/C DEALERS	TRUCKS	TRAILERS	MISCELLANEOUS	TOTAL	REFUNDS	NET TOTAL	EXPENSES	NET TOTAL RECEIVED	LESS CORRECTION OF OVERPAYMENT 1916	NET TOTAL FOR APPORTIONMENT	STATE AND COUNTY SHARE EACH
Alameda	309616.16	3984.90	4910.75	99.25	37759.80	556.00	265.05	357193.91	1342.96	355850.96	29105.05	326745.91	849.01	325896.90	162948.45
Alpine	159.88				36.10		2.00	196.98	11.80	185.18	15.18	170.00	169.62		84.81
Amador	6402.45	12.05	115.50		1002.55		13.95	7546.70	21.20	7525.50	1045.38	6480.12	20.97	6859.12	3444.56
Butte	47347.45	312.60	1111.00	21.50	4841.55	6.00	121.21	53761.11	146.85	53614.26	4365.11	49229.15	133.08	49096.07	24548.03
Calaveras	6143.35	28.10	50.20		1117.00		28.60	7367.25		7367.25	602.56	6764.69	24.36	6740.34	3370.17
Colusa	22896.20	78.20	563.25	5.00	2998.55	13.00	213.36	26767.55	113.30	26654.25	2180.05	24474.20	52.12	24422.08	12211.04
Contra Costa	48285.25	670.50	962.00	17.50	6493.25	82.00	222.53	56703.03	136.20	56567.03	4626.62	51940.41	140.27	51800.14	25900.07
Del Norte	2399.55	2.60	85.75		479.85		19.95	2988.70		2988.70	244.45	2744.25	7.30	2736.95	1368.48
El Dorado	3323.22	29.20	100.00		1343.65		36.40	7828.50	16.50	7812.00	638.94	7173.06	26.60	7146.46	3573.23
Fresno	242219.25	1778.55	4304.80	67.75	24447.25	78.00	306.07	273201.37	549.18	272652.22	22300.23	250351.99	616.66	249735.33	124868.66
Glenn	23225.65	138.60		12.50	2252.10	16.50	237.74	27883.09	114.90	27768.19	2271.16	25497.03	49.41	25447.62	12723.81
Humboldt	37777.30	265.55	1079.25	5.00	5938.35		147.55	44853.10	50.00	44803.10	3664.50	41140.50	105.70	41034.77	20517.39
Imperial	66170.18	147.65	1577.00		8347.90	12.00	373.70	76627.73	115.95	76511.78	6421.48	70090.30	229.80	71864.10	35932.05
Inyo	9783.05	11.50	175.75		634.75		62.20	10667.25	10.50	10656.75	871.62	9785.13	39.32	9745.81	4872.90
Kern	101846.93	839.20	2015.00	17.50	13884.30	126.50	316.25	119015.68	235.00	118780.68	9715.07	109065.61	378.03	108687.58	54343.79
Kings	40156.20	113.35	934.75	5.00	3316.95	140.00	201.35	44869.60	87.60	44782.00	3662.72	41119.28	106.03	41013.25	20506.63
Lake	7764.10	23.25	220.75		1002.00		27.00	9037.10	19.60	9017.50	737.54	8279.96	19.44	8260.52	4130.26
Lassen	8273.65	56.20	75.25		997.10		39.75	9441.95	21.20	9420.75	1015.69	8405.06	24.48	8380.58	4190.30
Los Angeles	1308263.32	12455.30	22769.60	200.50	166621.75	1897.50	1081.83	1513169.80	2620.20	1510549.60	123709.96	1386839.64	4360.48	1382479.16	691239.58
Madera	17538.60	129.30	350.85	5.00	2120.45	10.50	94.05	20248.75	43.40	20205.35	1652.60	18552.75	55.94	18496.81	9248.41
Marin	22741.10	161.75	144.50	5.00	2976.95	52.00	56.15	26737.45	108.25	26629.20	2096.21	23532.99	62.94	23470.05	11735.02
Mariposa	2650.75	9.45	25.00		440.40		15.00	3140.60	17.50	3123.10	299.71	2804.39	13.92	2890.47	1445.24
Mendocino	20111.88	82.55	532.80		3149.15	58.80	77.95	24012.80	37.30	23975.50	1980.99	22014.53	47.87	21966.66	10983.33
Merced	36455.80	212.15	737.75	5.00	3939.25	116.50	193.85	40690.10	77.10	40613.00	3304.74	37308.26	98.34	37209.92	18604.96
Modoc	10540.85	19.70	160.75		331.95		43.30	11096.55	.70	11095.85	907.03	10188.32	28.12	10160.20	5080.10
Mono	925.50				3.75			927.25		927.25	75.84	851.41	4.94	846.47	423.23
Monterey	35898.30	212.80	893.25	8.75	3769.05	58.00	282.96	41122.70	64.00	41058.70	3355.19	37703.51	107.50	37596.01	18798.01
Napa	23624.05	238.00	494.50	12.50	2612.90	64.00	91.32	27197.20	131.90	27065.40	2213.58	24851.72	49.88	24801.84	12400.92
Nevada	7590.20	37.85	150.75		663.00		16.75	8458.55	46.70	8411.85	688.00	7723.85	30.67	7693.18	3846.59
Orange	112833.80	1478.50	2143.75	45.75	7764.75	22.00	342.55	124631.10	93.10	124538.00	10185.96	114352.04	306.56	114045.48	57022.74
Placer	24216.65	188.70	382.50	5.00	4019.00	58.80	93.30	28963.65	128.25	28835.40	2358.45	26476.95	65.15	26411.80	13205.90
Plumas	5144.70	8.90	99.25		745.10		14.35	6012.30	9.80	6002.70	490.96	5511.74	17.29	5494.45	2747.23
Riverside	60534.40	345.95	1405.50	36.00	5361.55	108.00	213.55	77016.05	105.80	76909.25	6290.41	70618.84	228.75	70390.09	35195.04
Sacramento	119617.90	1078.85	2443.20	17.50	10616.60	250.00	284.16	142408.16	642.25	141765.91	11595.91	130170.00	452.79	129717.21	64858.60
San Benito	14119.30	91.95	291.25	5.00	1768.20	25.00	109.70	16410.40	42.50	16367.90	1338.73	15029.17	38.44	14990.73	7495.36
San Bernardino	94265.30	1384.05	1740.06	51.75	8356.20	110.00	373.15	106280.50	174.70	106105.80	8678.40	97427.40	336.75	97091.64	48545.82
San Diego	136111.79	1517.25	2278.70	80.25	13800.65	80.00	324.95	154233.59	198.65	154034.94	12549.45	140885.49	452.90	140432.59	70216.29
San Francisco	404873.94	3227.50	9555.25	75.75	90682.90	154.00	631.40	509201.74	1896.90	507304.84	41492.46	465812.38	1404.95	464407.43	232203.71
San Joaquin	123883.72	1135.80	2606.50	51.75	14428.05	41.00	328.53	142475.42	414.20	142061.22	11537.40	130823.82	563.03	129260.79	64880.40
San Luis Obispo	33722.50	160.20	510.75		2709.80	2.00	158.66	37263.66	78.50	37185.16	3041.37	34143.73	92.23	34051.50	17025.75
San Mateo	36521.15	535.05	568.80	17.50	5778.10	54.00	168.56	43642.85	147.15	43495.70	3557.52	39938.18	125.40	39812.78	19906.39
Santa Barbara	62261.10	460.20	1402.50	17.50	4877.40	8.00	228.52	69255.22	77.90	69200.32	5662.52	63537.80	238.41	63299.39	31649.69
Santa Clara	141525.40	1935.25	2786.50	50.75	17665.30	144.75	224.15	164521.10	416.45	164104.65	13422.12	150682.53	411.99	150270.54	75135.27
Santa Cruz	34836.20	244.15	905.25	15.00	4783.40	106.00	190.85	40990.85	174.10	40816.75	3338.40	37478.35	77.88	37400.47	18700.24
Shasta	15731.65	64.40	416.75	5.00	2471.50	14.50	171.40	18875.20	79.80	18795.40	1537.28	17258.12	45.89	17212.43	8606.21
Sierra	1606.35	8.90	70.25		140.50		.80	1826.50		1826.50	149.39	1677.11	10.73	1666.38	833.19
Siskiyou	17920.80	56.40	426.75		2175.50	4.00	163.16	20746.60	45.90	20700.70	1693.11	19007.89	53.93	18953.56	9476.83
Solano	42437.45	444.95	852.50	5.00	4510.60	2.00	287.06	47515.95	87.80	47428.15	3879.17	43549.28	93.84	43455.44	21727.72
Sonoma	52560.90	477.25	2126.75	17.50	6275.75	10.00	190.45	59658.60	178.20	59547.30	4870.20	54677.10	196.78	54511.32	27255.66
Stanislaus	90732.90	763.65	1917.75	36.00	7728.90	38.50	322.95	101540.65	193.30	101347.45	8289.21	93058.24	258.88	92799.36	46399.68
Sutter	17898.90	81.00	85.50		2244.80	56.00	125.96	20492.15	36.75	20445.40	1672.23	18773.17	45.55	18727.62	9363.81
Tehama	18803.00	131.15	385.50	5.00	1582.25	6.00	90.70	21007.60	40.40	20967.20	1714.91	19252.29	83.07	19169.22	9584.61
Trinity	1181.15		17.90		99.60		347.00	1644.75		1644.75	134.52	1510.23	6.62	1503.61	751.80
Tulare	104760.45	562.10	2089.25		10560.95	52.50	77.90	118136.65	299.85	117836.80	9637.90	108197.90	324.47	107873.43	53936.71
Tuolumne	7280.25	28.35	95.50	12.50	995.70		52.80	8452.30	12.10	8440.20	690.20	7750.00	38.11	7711.89	3855.95
Ventura	51520.20	298.85	822.75	5.00	5000.35	6.50	250.40	57904.05	98.60	57805.45	4727.91	53077.54	145.46	52932.08	26466.04
Yolo	33811.25	278.40	610.50	5.00	4132.80	54.00	132.50	39966.45	276.35	39690.10	3173.00	36523.10	111.92	36411.18	18749.90
Yuba	15418.60	80.50	293.00		2296.70	4.00	150.50	18974.30	26.50	18947.80	1548.80	17398.98	48.37	17350.61	8681.29
TOTALS	4388789.37	39090.35	84125.50	1019.25	559098.50	4642.55	10693.53	5087459.05	12224.55	5075234.50	415103.41	4660131.09	13601.86	4646529.23	2323264.61

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APPENDIX Q.

SHOWING STATE HIGHWAY CONTRACTS ARRANGED BY COUNTIES AND ROUTES, WITH LENGTHS, TERMINI AND OTHER STATISTICS.

COMPLETED CONTRACTS, JUNE 30, 1920.

Con. No.	L.O. No.	Div.	County	Rte.	Sec.	From	To	Length (Miles)	Contract Date	Contractor	Res. Engineer	Type of Work	Final Estimate Work	Final Estimate Materials	Final Estimate Total	Exper. during Const.	Total
90	113	IV	Alameda	5	A	Greenville	Livermore	4.97	8-11-14	Parrott Bros. Co.	J. D. Green	18 ft. Concrete Base	27149	21692	48841	3331	52172
136	136	"	"	"	"	Easterly Boundary	Altamont	6.00	10-6-14	Palmer & Mayers	H. C. Byrd	18 ft. Concrete Base	43743	34112	77855	4761	82616
D-142	182-236	"	"	"	"	Altamont	Greenville	10.68	7-12-17	Bates, Borland & Ayer	H. C. Byrd	Oiled Surfacing	4543	3745	8288	435	8723
D-143	185	"	"	"	"	Livermore	Santa Rita	5.82	11-6-15	H. G. Vaughn Const. Co.	J. D. Green	18 ft. Concrete Base	34528	24250	58778	4448	63226
179	270	IV	"	5	B	Santa Rita	Dublin	3.24	5-22-17	Bates, Borland & Ayer	H. C. Byrd	18 ft. Concrete Base	29726	24795	54521	4058	58579
230	307	IV	"	5	C	Hayward	Valle Vista School	3.12	4-22-14	Tiedlau Brothers	H. C. Ingworth	18 ft. Concrete Base	21724	19938	41662	2513	44175
D-7	40-102	IV	"	5	C	Overachers Corner	Southerly Boundary	8.40	7-19-16	O. G. Ritchie	A. E. Blockley	18 ft. Concrete Base	104764	67078	171842	7880	179722
D-44	60	IV	"	5	C	Valle Vista School	Niles	6.62	11-19-14	Day Labor	C. C. Cottrell	18 ft. Concrete Base	9238	6743	15981	2295	18276
						Hayward	Niles	8.96	5-14-15	Day Labor	C. C. P. Georges	Oil Surfacing	3333	3803	7136	287	7423
B-119	61	IV	"	5	C	S.P.R.R. Under Crossing		.09	5-13-17	Day Labor	J. D. Green	Concrete Base	1397	446	1843	113	1956
D-58		IV	"	"	"	Hayward Maintenance Station	Oakland	5.08	10-12-19	Dunegan Tramway Co.	Geo. Hale	Asphaltic Concrete Surfacing	23,975	9472	33447	2543	35990
						Oakland Maintenance Station						Equipment Houses	2,500	1,000	3,500	200	3,700
207	218-238	III	Butte	3	A	Southerly Boundary	Biggs	7.68	10-17-17	Municipal Imp. Co.	J. L. Piper	18 ft. Concrete Base	68699	42370	111069	7469	118538
D-124	124	III	"	3	A	Station 200-50	Chico	12.77	12-19-19	Taylor & Gerrill	J. L. Piper	18 ft. Concrete Base	77633	70853	148486	9462	157948
D-92	211	III	"	3	C	4th St. Chapmantown	Little Chico Creek	12.40	12-19-15	Day Labor	J. H. Harvell	15 ft. Concrete Base	7853	1668	9521	614	10135
D-202		III	"	3	C	So. Appr. to White Creek Bridge		.02	5-26-19	Day Labor		15 ft. Concrete Base	400	318	718		718
70	20-148	III	"	3	D	Lindo Channel	Northerly Boundary	12.70	6-9-14	P. L. Barr	J. H. Harvell	15 & 18 ft. Conc. Base	70123	28596	128819	7856	136375
227	346	III	"	4	A	Oroville	Shippee Road	6.38	7-2-18	Mt. Shumaintrans	M. H. Reid	18 ft. Concrete Base	100673	43105	143778	7997	151775
D-234		III	"	24	A	If Feather River Bridge			11-16-19	Day Labor	M. H. Reid	Bridges	1984		1984		2375
228	351	III	Calaveras	24	B	Easterly Boundary	Valley Springs	10.00	7-2-18	Frank C. McIntyre	M. G. Ayers	Grading	64272	6567	70839	6123	76962
D-104	231	III	"	24	B	Valley Springs	San Andreas	10.00	5-11-16	Day Labor	F. J. Hunter	Grading	54066	5685	59743	970	60713
80	93	III	Colusa	7	A	Hershey	Berlin	10.97	6-23-14	C. L. Schaad	C. F. Holmes	18 ft. Concrete Base	63629	50066	113695	6983	120678
161	93	III	"	7	A	Through Arbuckle	Arbuckle	6.31	8-10-15	Clark & Henery Con. Co.	C. D. Robinson	22.5 ft. Topeka Surf.	6667		6667	216	6883
68	122	III	"	7	A	Hershey	Colusa	6.92		Day Labor	Oiled Surfacing		2827	1332	4159	428	4587
D-203	122	III	"	7	B	Br. R. Crossing Colusa & Lab		.01	9-10-14	Day Labor	H. F. Kelley	15 ft. Concrete Base	60886	77655	138541	1454	140487
139	172	III	"	7	C	Colusa Junction	Northerly Boundary	10.69	6-22-16	Ira F. Gardetz	H. R. Hatchett	18 ft. Concrete Base	46915	48428	97343	4130	101473
D-174	174	III	"	7	C	Williams Jct. 200-00 (Exc.)	Colusa	8.44	12-22-14	C. J. Cross	H. R. Hatchett	18 ft. Concrete Base	45534	43454	88988	2680	91668
117	141	III	"	15	A	Williams			12-22-14		H. R. Hatchett	15 ft. Concrete Base	39387		39387		41561
57	114	IV	Contra Costa	14	A	San Pablo Creek	Pinole	3.98	8-11-14	C. H. Pickrell & Ayer	C. H. Lyon	Grading	21273	3511	24784	2776	26519
170	139-140	IV	"	14	A	Richmond	Richmond	2.54	7-10-16	Shepherd, Brown & Co.	Maj J. Jacobs	18 ft. Topk. on Con. Base	33347	17058	50405	4215	54620
	215	IV	"	14	A	300 ft. from Alameda Co. Line			11-15-15	Day Labor	C. P. Georges	Oiled Surfacing	1178		1178	111	1289
	114-158	IV	"	14	A	Richmond	Pinole	5.97	11-15-15	Day Labor	C. P. Georges	Oiled Surfacing	2329	1354	3683	1551	5234
D-86	158	IV	"	14	A	At San Pablo & Wild Cat Creeks			12-6-16	Bates, Borland & Ayer	Wm. H. Jacobs	Wing Walls on Bridges	280	61	341	33	374
103	158	IV	"	14	A	Martinez	Bay View	6.49	9-22-14	Bates, Borland & Ayer	J. C. Blakemore	Grading	54723	5852	60575	3706	64281
141	158	IV	"	14	A	Bay View	Pinole	3.46	7-10-16	Bates, Borland & Ayer	J. C. Blakemore	Grading	44634	4705	49339	3021	52360
D-133	133	IV	"	14	A	Pinole	Martinez	6.49	8-28-17	Day Labor	P. W. Hall	18 ft. Concrete	69761	7493	77254	4838	82092
						Martinez											
A-209	190	IV	"	14	B	At Valona	Martinez	.19	9-25-18	Day Labor	J. A. McDevitt	Conc. Retaining Wall	3721	3460	7181	1094	8275
D-254	254-260	IV	"	14	B	Herculies		6.22	9-13-19	Day Labor		Guard Rail	17215		17215	613	17828
173	228-238	III	El Dorado	11	A	White Rock	Shingle Springs	10.28	11-29-17	Day Labor	O. P. Dodd	18 ft. Concrete Base	228405	43513	271918	6828	278746
D-5	66	III	"	11	A	Shingle Springs	Placerville	6.67	4-22-14	Day Labor	O. P. Dodd	18 ft. Conc. Base-Oil Sur.	127136	43325	170461	4828	175289
				11		El Dorado						18 ft. Conc. Base-Oil Sur.					
46	61	VI	Fresno	4	A	Fowler	Kingsburg	9.27	11-21-13	A. Teichert & Sons	D. H. Chamberlin	18 ft. Conc. Base-Oil Sur.	44718	27734	72452	4425	76877
212	61	VI	"	4	A	Kingsburg	Fresno	7.77	11-13-17	Shepherd, Brown & Co.	C. L. Poulin	Topeka Surfacing	43935	27333	71268	3412	74680
212	60	VI	"	4	A	Fresno	Selma	2.68	11-13-17	Shepherd		Bituminous Pavement	2248		2248		2248
A-260	9-60	VI	"	4	B-C	Intch. Jensen Ave., Sta. 387+66	to Sta. 389+76	.02	5-4-20	Day Labor		Conc. Base-Marcadam Sur.	297		297		297
						Van Ness Boulevard & Belmont Ave., Intersections			9-6-19	Day Labor							
A-267	9	VI	"	4	C		Wardman	8.58	8-27-18	Yosemite St. Par. Co.	D. H. Chamberlin	18 ft. Conc. Base-Oil Sur.	14677		14677	3100	17777
	60	VI	"	4	C	Fresno	Old King School	8.06	8-6-20	Day Labor	B. F. Corfield	Conc. Base	341		341		341
	9	VI	"	4	C	Coalinga	Old King School	8.06				Mering Conc. Aggregate					
	9	VI	"	10	C												
	9	VI	"	10	D												
	9	VI	Kings	10	C	Southerly Boundary	Hanford	8.59	11-20-14	C. H. Cross	H. R. Hatchett	18 ft. Concrete Base	43291		43291		43291
113	113	III	"	7	A	Willows	Orwood	9.43	7-10-18	Taylor & Taylor	H. R. Hatchett	18 ft. Concrete Base	45,000	35178	80178	4251	84429
142	142	III	"	7	A	Willows	Willows	7.04	7-10-18	Taylor & Taylor	H. R. Hatchett	18 ft. Concrete Base	33705	26,000	59705	3412	63117
213	213	III	"	7	A	Willows Bear Creek	Walnut Creek Bridge Appra.	1.04	3-26-19	Day Labor	J. A. McDevitt	18 ft. Conc. Base	4,000	2,000	6,000	300	6,300
213	213	III	"	7	A	Orwood		6.34	5-6-14	P. L. Moore	J. A. McDevitt	18 ft. Concrete Base	40374	30611	70985	4558	75543
D-97	97	III	"	7	C	Orwood	Northerly Boundary			Day Labor	J. A. Haviland	Oiled Surfacing	3087	1305	4392	243	4635

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COMPLETED CONTRACTS, JUNE 30, 1920.

Con.No.	L.O. No.	Div.	County	Rte.	Sec.	From	To	Length (Miles)	Contract Date	Contractor	Res. Engineer	Type of Work	Final Estimate Work	Materials	Total	Engineering Const.	Total
44	54	I	Humboldt	1	A	Garberville	Sec.1 T.5 S. R.3 E.	5.48	10-29-13	Fairbanks & Raechtel	L. O. Kennedy	Grading	49075	3361	52466	2463	54929
60	78	I	"	1	A	Sec. 1 T.5 S., R. 3 E.	Southerly Boundary	4.58	4-22-14	Harry Mackie & Co.	L. O. Kennedy	Grading	60619	4105	64725	1984	66709
D-245		I	"	1	A	Appro. to South Fork Bridge			6-15-15	Day Labor		Grading	1703	69	1772	34	1806
211	302	I	"	1	B	Garberville	Miranda	16.61	11-19-17	Palmer & McBryde	E. M. Cameron	Grading	242693	24869	267562	14133	281695
D-250	302	I	"	1	B	Station 370+00	Station 850+00	4.98	9-3-19	Day Labor		Gravelling	2336	10662	12998		12998
93	118	I	"	1	C	Miranda	Dyerville	13.75	8-11-14	Fairbanks & Raechtel	E. M. Cameron	Grading	151011	9463	160474	7034	167508
71	91	I	"	1	D	Dyerville	Shively	7.28	6-9-14	Frank Smith & G.W.Connor	F. E. Mackey	Grading	97247	5223	102569	5522	108091
104	110	I	"	1	D	Shively	Jordan Creek	3.70	10-6-14	Mr. Crowley & T.P.Cloney	J. H. Pratt	Grading	37870	1363	39233	2226	41459
D-156	91	I	"	1	D	Station 0+00	Station 13+00	.25	8-13-17	Day Labor	Wynn Meredith	Grading	4435	193	4628		4628
136	173	I	"	1	E	Jordan Creek	Rio Dell	6.86	6-2-15	Bates, Borland & Ayer	J. H. Pratt	Grading	63240	4872	68112	3556	71668
166	230	I	"	1	E	Eel River Bridge near Scotia		.19	4-25-16	Mercer, Fraser Co.	J. F. Johnson	Steel Bridge	107322	13085	120407	1214	121621
206	297	I	"	1	F	Rio Dell	Fortuna	6.51	9-18-17	A.Robinson & H.R.Smith	Wynn Meredith	Grading	42962	4175	47187	3228	50415
D-27	297	I	"	1	F	2# miles north of Rio Dell	1/4 mile south of Alton	.82	12-31-13	Day Labor	C. L. Lang	Grading	12294	232	12526	864	13390
D-216		I	"	1	F	Van Duzen Creek Bridge Extension		.10	2-21-19	Day Labor		Timber Bridge	1161		1161		1161
108	135	I	"	1	G	Loleta	Beatrice	4.30	10-6-14	Kilsmore & Jacobs	R. M. Wilson	Grading	21774	2533	24307	2160	26467
169	135	I	"	1	G	Loleta	Beatrice	4.30	7-10-16	Kilsmore & Jacobs	T. M. Dinsmore	15 ft. Concrete Base	22876	14056	36932	5420	42352
240		I	"	1	G	Eureka Slough Bridge		.13	2-26-19	Mercer, Fraser Co.	J. C. Lewis	Timber Bridge	54262	13363	77625	2696	80321
107	117	VII	Imperial	12	A	Meyers Creek	Coyote Wells	6.02	10-6-14	J. W. Calbot	C. M. Wondries	15 ft. Concrete Base	82590	23363	105953	6665	112618
159	208	VII	"	12	A	Meyers Creek Bridge		.06	11-23-15	Holland Const. Co.	J. M. Harvell	Concrete Bridge	26382	6188	33570	2529	36099
D-100	117	VII	"	12	A	San Diego & Arizon R.R. Crossing				Day Labor	C. M. Wondries	Abuts. for Under Crossing	9435	2979	12514	35	12549
D-107		VII	"	12	A	Meyers Creek	Coyote Wells			Day Labor	C. M. Wondries	Constructing detours	1527	473	2000	32	2032
116	142	VII	"	12	B	Coyote Wells	Dixie Land	11.74	12-8-14	Hice & Butcher	A. W. Allen	15 ft. Concrete Base	76539	34897	111436	5481	117917
161	214	VII	"	12	C	Dixie Land	El Centro	11.87	12-12-15	Fred Hoffman	A. W. Allen	15 ft. Concrete Base	72066	32940	105006	4920	109926
178		VII	"	12	C	New River Bridge		.06	2-6-17	Marcuse Eng.&Con.Co.	L. M. Ransom	Concrete Bridge	12349	7189	19538	1621	21159
D-165		VII	"	12	C	Paving at Brawley Canal		.01	10-6-17	Day Labor		15 ft. Concrete Base					
D-183		VII	"	12	C	New River Bridge		.36	1-31-18	Day Labor	L. M. Ransom	Grading	2663		2663	72	2742
D-223		VII	"	12	C	Appro. to New River Bridge		.26	3-26-19	Day Labor	E. Mauer	15 ft. Concrete Base	3314	3542	6856	82	6938
D-234	407	VII	"	26	C	Kane Springs	Tule Wash	11.33	1-2-19	Day Labor	M. Ransom	8 & 15 ft. Conc. Base	240182	76733	316886	4818	321703
D-292		VII	"	27	A	High Line Canal	1 mile east	1.00	12-16-19	Day Labor		15 ft. Willite Pavement	36474	6961	43435	911	44366
D-291	408	VI	Inyo	23	A	Independence	Division Creek	2.73	11-13-19	Day Labor		Grading	14234	2008	16242	794	17036
D-114	263	VI	"	23	B	Division Creek	Fish Springs School	10.36		Day Labor	C. C. Boyer	Grading & 8 ft.Conc.Base	85262	21837	107103	3618	110621
D-215	371	VI	"	23	F	Round Valley	Northerly Boundary	5.84	1-23-19	Day Labor		Grading	38435	3297	41732	1954	43686
106	126	VI	Kern	4	A	Southerly Boundary	2.3 mi. So. of Rose Sta.	10.37	10-6-14	A. C. McLean Const.Co.	C. C. Boyer	Grading	86424	6177	92601	9288	101889
D-75	126	VI	"	4	A	Southerly Boundary	2.3 mi. So. of Rose Sta.	8.66	9-24-15	Day Labor	H. H. McGill	Oiling Graded Road	3617		3617	289	3906
D-96	105	VI	"	4	B	Grapevine Creek	Sec.5 & 8 T.32 S. R.28 E.	11.38	8-24-14	Lynn S. Atkinson	H. H. McGill	15 ft. Concrete Base	230598	52795	283394	9734	293128
D-94	105	VI	"	4	B	Grapevine Creek	Sec.5 & 8 T.32 S. R.28 E.	11.38	1-7-16	Day Labor		Oiled Surfacing	514	7604	8118		8118
67	97	VI	"	4	C	Sec.586, T.32 S. R.28 E.	Bakersfield	12.98	5-27-14	John D. Marsh	J. C. North	15 ft. Concrete Base	84338	57193	141531	6998	148529
D-21	97	VI	"	4	C	Sec.586, T.32 S. R.28 E.	Bakersfield	12.98		Day Labor	R. J. Pardee	Oiled Surfacing	4799	3524	8323	276	8599
D-28	69	VI	"	4	D	Bakersfield	Lerdo	10.12	2-26-14	Geo. S. Benson & Sons	C. V. James	15 & 24 ft. Conc. Base	36061	40752	76813	4875	81688
D-30	365	VI	"	4	D	Beardsley Canal		.01	1-12-15	Day Labor	H. H. McGill	Reinforced Conc. Bridge	3690	1868	5558	4018	9576
D-96	69	VI	"	4	D	Bakersfield	Lerdo	10.14		Day Labor	H. H. McGill	Oiled Surfacing	4210	2437	6647	280	6927
51	70	VI	"	4	E	Lerdo	Famosa	9.06	2-26-14	Geo. S. Benson & Sons	C. V. James	15 ft. Concrete Base	27429	36169	63598	4009	67607
D-41	70	VI	"	4	E	Lerdo	Famosa	9.09		Day Labor	R. J. Pardee	Oiled Surfacing	3383	1874	5257	217	5474
53	82	VI	"	4	F	Northerly Boundary	Dearborn	12.45	4-22-14	Lynn S. Atkinson	A.F.Garlinghouse	15 ft. Concrete Base	51330	50799	102129	3705	105834
D-35	82	VI	"	4	F	Northerly Boundary	Dearborn	12.44		Day Labor	R. J. Pardee	Oiled Surfacing	4498	2967	7465	313	7778
138	171	VI	Kings	10	A	Hanford	Easterly Boundary	8.96	6-22-15	Geo. S. Benson & Sons	C. E. Brown	15 ft. Concrete Base	57468	37563	95031	3515	98546
D-276	171	VI	"	10	A	Station 20+50			10-23-19	Day Labor		Concrete Culvert	367	121	488		488
D-117	333	II	Lassen	29	B	Near Susanville		1.00	1-29-17	Day Labor		Grading	328	447	775		775
17	17	VII	Los Angeles	2	A	County Highway No. 3	Rancho El Encino	6.55	10-22-12	Rogers Bros. Co.	C. G. Kolster	15 ft. Conc.Base-Oil Sur.	35538	14639	51177	3494	54671
251	17	VII	"	2	A	Lankershim Boulevard	South Sherman Way	5.22	9-12-19	Bryant & Austin, Inc.	H. C. Reeder	20' Con.Base-14' Topk.Sur	50025	10640	60665	1728	62393
21	29	VII	"	2	B	Rancho El Encino	Calabasas	10.27	3-4-13	John D. Marsh	C.F.Spellmeyer	15 ft.Conc.Base-Oil Surf.	69008	29852	98860	7767	106627
23	38	VII	"	2	C	Calabasas	Westerly Boundary	11.28	5-21-13	Gillette, Montgomery & Tracy	C. G. Kolster	15 ft. Concrete Base	109968	28825	138793	6000	144793
D-14	38	VII	"	2	C	Calabasas	Westerly Boundary	11.28		Day Labor	H. E. Postle	Oil Surfacing	17477	2047	19524	538	20062
D-278	38	VII	"	2	C	Calabasas Maintenance Sta.			10-23-19	Day Labor	F. W. Heizer	Warehouse & Fence	2601	379	2980		2980
134	168	VII	"	4	A	Saugus	Castaic	4.21	6-1-16	H.H.Kennedy & F.Williams	J. C. Nore	15 ft. Concrete Base	20952	10537	31489	3228	34717
181	272	VII	"	4	A	Castaic	Castaic School	4.08	5-22-17	Brashear, Burns Co.	L. W. Cummings	15 ft. Concrete Base	29740	13740	43480	3432	43912
D-91	168	VII	"	4	A	Santa Clara River				Day Labor	J. C. Nore	Bank Protection	3133		3133	842	3975
D-199	272	VII	"	4	A	Newhall Property			8-19-18	Day Labor		Fencing Right of Way	491		491		491

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COMPLETED CONTR ACTS, JUNE 30, 1920.

Con. No.	L.O. No	Div.	County	Rte.	Sec.	From	To	Length (Miles)	Contract Date	Contractor	Res. Engineer	Type of Work	Final Estimate: Work	Materials	Total	Engr. & Adm. Const.	Total
D-329	272	VII	Los Angeles	4	A-B	Station 320 (Sec A)	Station 200 (Sec. B)	3.74	4-2-20	Day Labor	W. F. Hasby	Willite & Topsoil Surface	10,208		10,208	356	10,564
101	128	VII	"	4	B	Castaic School	Sec. 17, T.6 N., R.17 W.	12.84	6-24-14	Mooney Bros.	W. J. Shoaf	Grading	127,417	6,970	134,387	12,366	146,753
202	128	VII	"	4	B	Castaic School	Ray Ranch	4.98	9-30-14	Wrashear, Ehrma Co.	J. C. Bedford	20 ft. Concrete Base	13,683		13,683	1,017	14,700
D-63	128	VII	"	4	B	Castaic School	Sec. 17 T.5 N. R.17 W.	12.84	6-24-16	Day Labor	W. S. Gripper	Oiling Graded Road	2,000		2,000	143	2,143
D-217	128-151	VII	"	4	B-C	Completing Ridge Route		14.92	9-11-19	Day Labor	W. C. Foster	20 ft. Concrete Base	194,998	162,291	357,288	5,609	362,898
D-127	88-128-151	VII	"	4	BCD	Castaic School	Northerly Boundary		8-14-17	Day Labor	C. S. Grace	Grading-Widening Curves	34,040		34,040	206	34,246
128	151	VII	"	4	C	Sec. 17, T.6 N., R.17 W.	Liebre Mountain	14.82	12-22-14	Lee Moor Const Co.	W. S. Gripper	Grading	301,938	14,466	316,404	13,972	330,376
D-64	151	VII	"	4	C	Sec. 17, T.6 N., R.17 W.	Liebre Mountain	14.82	6-24-16	Day Labor	W. S. Gripper	Oiling Graded Road		See D-63			
D-146		VII	"	4	C	Moving pipe line to Ridge Route			7-6-17	Day Labor	C. S. Grace	For Water Supply	2,887	1,867	3,754		3,754
D-174		VII	"	4	C	Opening quarries on Ridge Route			11-25-17	Day Labor	C. S. Grace	Rock Supply	1,599		1,599		1,599
D-178	88-151	VII	"	4	C-D	Station 567+00, Sec C	Station 128+00 Sec. D	6.76	1-10-18	Day Labor	C. H. Ainley	20 ft Concrete Base	138,967	56,729	195,696	2,523	198,223
79	88	VII	"	4	D	Liebre Mountain	Northerly Boundary	12.62	6-8-14	Lee Moor Const. Co.	W. S. Gripper	15 ft. Concrete Base	147,296	33,120	180,416	14,643	194,861
D-90	88	VII	"	4	D	Liebre Mountain	Northerly Boundary	8.34		Day Labor	J. W. Cummings	Oil Surfacing	4,035	1,000	5,035		5,035
D-168	88	VII	"	4	D	Liebre Mountain	Northerly Boundary	4.68	10-11-17	Day Labor	C. S. Coleter	Oil Surfacing	3,365		3,365	212	3,578
147	184	VII	"	9	A	Rancho Tejunga	La Canada	4.90	7-23-15	A. Holloway	W. J. Shoafe	15 ft Concrete Base	37,980	13,989	51,969	4,735	56,704
213	301	VII	"	9	A	San Fernando	Rancho Tejunga	10.02	11-19-17	A.L.McCray & G.H.Oswald	C.F. Spellmeyer	15 ft. Concrete Base	109,884	29,297	139,181	7,981	146,772
D-294	301	VII	"	9	A	At Dangerous Points		.80	5-28-19	Day Labor		Guard Rail	718		718		718
D-79	88-184	VII	"	9	C-D	County Highway Div. 34	Easterly Boundary	.80	6-24-15	Day Labor	C. H. Hendries	16 ft.Conc.Base-Oil Sur.	7,163	2 845	10,008	880	10,888
D-190	289	VII	"	9	I	Near Glendora				Day Labor		Bank Protection	400		400		400
227	325	VII	"	23	B	Santa Clara River Bridge		.04	1-23-19	J.P. Hunter & R.A.Matteson	W. C. Reeder	Concrete Bridge	8,290	3,147	11,437	838	12,275
260	121	VII	"	23	B	Santa Clara River	Williams Ranch	1.86	8-30-19	Prendergast Const. Co	C.P.Montgomery	20 ft. Concrete Base	36,994	13 537	49,531	1 486	51,087
D-167	325	VII	"	23	B	Santa Clara River Bridge				Day Labor		Concrete Piling	443	1.178	1.621		1.621
D-306	325	VII	"	23	B	Santa Clara River Brg.Approx.			2-14-20	Day Labor		Grading	104		104		104
D-126	301	VII	"	23	B	Bealey Ranch	Near Acton	10.60	1-10-18	Day Labor	C. H. Ainley	20 ft Concrete Base	125,001	62,344	207,345	5,514	212,859
D-135	325	VII	"	23	B	Near Lotem	Near Vincent	2.00	1-10-18	Day Labor		Grading	17,000	1,422	18,422	842	19,264
D-267		VII	"			Lankershim Maintenance Sta.			10-15-19	Day Labor		Equipment House	11,648	2,996	14,584	109	14,693
9	10	VI	Madera	4	A	Southerly Boundary	Madera	9.99	8-27-12	Norwwick St. Pav. Co.	D.W.Chamberlin	15 ft.Conc.Base-Oil Sur.	48,367	24 398	73,665	4,234	77,899
3	3	VI	"	4	B	Madera	Calif a	10.00	7-24-12	Ramsome Crumsey Co.	C. V. James	15 ft. Oil Macadam	59,663	344	58,007	4,206	73,832
10	11	VI	"	4	C	Calif a	Northerly Boundary	6.98	8-27-12	Norwwick St. Pav Co.	E. H. Modill	15 ft.Conc.Base-Oil Sur.	34,739	15.097	49,836	4 663	54,499
180	186	IV	Marin	1	A	Northerly Boundary	Gallinas Creek	4.00	8-10-16	R. B. Markle, Jr.	I.C.Hopkinson,Jr.	Grading	22,911	2,942	25,853	3,805	29,658
208	186-220	IV	"	1	A	Northerly Boundary	San Rafael	15.97	10-17-17	Edmund J. Treacy	H.J. Flynn	15 ft. Concrete Base	209,818	101,015	310,833	24,364	335,197
P-85	186	IV	"	1	A	Northerly Boundary	Gallinas Creek	1.04	12-2-15	Day Labor	C.C. Cottrell	Gravel Surfacing	3,790	713	3,453	43	3,496
P-226	186	IV	"	1	A	Station 247+35	Station 248+55	.03	4-21-19	Day Labor	H. E. Hessmer	Removing Hillos	3,638	197	3,835	127	3,962
60	95	IV	"	1	A	Larkspur	Sausalito	6.00	5-24-14	O'Connor Bros	Clay Anderson	Grading	60,000	10,170	70,971	5,147	76,118
173	95	IV	"	1	B	Larkspur	Sausalito	5.06	7-10-16	Marin Rock Co.	I.M.Atkinson	16 ft. Concrete Base	27,978	27,677	55,655	5,149	60,804
P-265	182	IV	"	1	B	Ross	Larkspur	.09	4-6-16	Day Labor	C. C. Cottrell	16 ft. Concrete Base	12,472	5,182	17,654	568	18,222
P-94	182	IV	"	1	B	At Coyote Creek		.08	1-1-16	Day Labor	Monthly	Grading	1,000		1,000		1,000
P-223	95	IV	"	1	B	Larkspur	Sausalito	.98	7-6-19	Day Labor	H. E. Hessmer	16 ft. Concrete Base	13,866	10,800	24,746	1 371	26,120
214	214	IV	"	1	A	Novato Creek & Simond's Slough		14	12-19-17	Dunnemann-Harrelson Co.	H. E. Hessmer	Concrete Bridge	33,294	7,527	40,821	705	41,526
234	234	IV	"	8	A	Ignacio	Black Point	2.75	6-26-18	H. C. Flynn	J. E. Kreitler	Grading	10,326		10,326	1,428	12,304
D-110	284	IV	"	8	A	Station 0+00	Station 136+00	2.12	8-14-15	Day Labor	J. S. Green	Grading	14,688	76	14,788	1,256	16,044
143	188-240	IV	Marin-Sonoma	8	A	Petaluma Creek Bridge		.27	1-11-16	Healy-Tibbitts Con. Co.	B. C. Gerwick	Rascule Bridge	93,912	7,665	101,577	6,966	108,543
D-252		IV	"	8	A	Petaluma Creek Bridge			11-16-19	Day Labor		Auxiliary Power	506	1	507	1	508
187	206	VI	Mariposa	18	A	Westerly Boundary	Cathay White Rock Road	10.05	11-9--16	G. B. Daley	Geo. S. Badger	Grading	66,804	5,966	71,870	6,556	78,426
111	206 (Exc)	VI	"	18	A	Owens Creek Bridge, Sta.409		.08	10-11-12	Day Labor	Geo. S. Badger	Concrete Bridge	1,643	1,758	3,400	243	3,643
203	206	VI	"	18	A	Westerly Boundary	Station 530	10.05	7-6-17	Day Labor		Oil Surface	1,903		1,903		1,903
178	206	VI	"	18	B	Cathay White Rock Road	Agua Fria Creek	1.00	7-28-16	Day Labor	Geo. S. Badger	Grading	134,891	6,000	140,891	5,080	146,971
178A	206	VI	"	18	C	Agua Fria Creek	Mariposa	6.00	10-19-17	Day Labor	Geo. T. Garfield	Grading	92,814	4,014	96,828	1,248	98,076
344		VI	"	18	C	Agua Fria Creek Bridge		.08	6-1-19	Day Labor		Concrete Bridge	6,888	2,919	9,441	135	9,576
2	2	I	Mendocino	1	A	Southerly Boundary	Hopland	13.91	7-23-12	General Contracting Corp.	F. A. Kittridge	Grading	88,380	719	93,019	2,678	95,694
87	109	I	"	1	A	Hopland	Ukiah	11.40	6-11-14	Ward Brothers	C. J. Archer	15 ft. Concrete Base	77,000	15,898	94,228	8,164	102,392
D-113	109-239	I	"	1	A	2 miles South of Ukiah	Ukiah	1.00		Day Labor	C. J. Archer	Oil Surfacing	3,729		3,729		3,729
38	238	I	"	1	C	Ukiah	Forsythe Creek	4.00	3-26-13	D.L.Sawyer & C. Whited	C. D. Archer	Oiled Macadam	74,219	4,529	78,748	5,419	84,167
97	95	I	"	1	D	Forsythe Creek	Ridgewood	6.56	4-22-14	Ward Brothers	Wynn Meredith	Grading	88,912	3,992	89,904	5,027	94,931
P-1	95	I	"	1	D	Forsythe Creek	Ridgewood	1.24		Day Labor	T. O. Kennedy	Grading	15,657	1,109	16,646	1,089	17,675
P-39	95	I	"	1	D	Ridgewood	Willits	6.84	9-1--13	Fairbanks & Haschtel	T. O. Kennedy	Grading	38,268	672	38,138	3,416	42,888
147	95	I	"	1	E	Willits			10-16-17	Day Labor		Temporary Garage	1,402		1,402		1,402
222	95	I	"	1	E	Willits	Arnold	8.34	12-14-17	Workman & Patterson	F. W. Howard	Grading	121,713	7,163	128,876	5,504	134,380
		I	"	1	F	Outlet Creek			7-19-18	C. E. Gildersleeve	F. W. Howard	Reinforced Conc. Bridge	9,283	5,242	14,526	203	14,729

* Costs shown under D-63 include costs incurred under D-64 *

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COMPLETED CONTRACTS, JUNE 30, 1920.

Con. No.	L.O. No.	Div.	County	Rte.	Sec.	From	To	Length (Miles)	Contract Date	Contractor	Res. Engineer	Type of Work	Final Estimate: Work	Final Estimate: Materials	Final Estimate: Total	Engineering Const.	Total
69	18	VI	Merced	4	A	Merced	Southerly Boundary	14.27	5-27-14	Taylor & Berliner	R. S. Badger	15 ft. Concrete Base	59,304	61,865	121,189	6,945	128,104
D-42	18	VI	"	4	A	Merged	Southerly Boundary	14.38		Day Labor	R. S. Badger	Oil Surfacing	5,726	3,742	9,468	393	9,478
D-176		VI	"	4	A	At Station 261+13		.01	12-31-17	Day Labor		15 ft. Concrete Base	190	97	287		287
D-182		VI	"	4	A	Station 463+15	Station 483+47		1-24-18	Day Labor		15 ft. Concrete Base	2,322	117	2,439		2,439
D-221		VI	"	4	A	Station 312+13.5	Station 312+92		3-14-19	Day Labor		15 ft. Concrete Base	174	36	209		209
11	12	VI	"	4	C	Arena	Merced	10.86	9-25-12	Worswick St. Pav. Co.	R. S. Badger	15 ft.Conc.Base-Oil Sur.	61,818	4,426	96,014	6,286	102,948
D-177		VI	"	4	C	Station 884+33		.01	12-31-17	Day Labor		15 ft. Concrete Base	970	68	1,038	341	1,379
D-289	12	VI	"	4	C	Atwater			11-6-19	Day Labor		7-3/4 ft. Conc. Shoulders	1,855		1,855		1,855
6	6	VI	"	4	D	Northerly Boundary	Arena	9.74	8-31-12	Worswick St. Pav. Co.	R. S. Badger	15 ft.Conc.Base-Oil Sur.	53,317	22,166	75,484	4,344	79,828
D-145		VI	"	4	D	Station 5+58 & Sta. 7+41		.02	7-5-17	Day Labor		15 ft. Concrete Base	626	222	848		848
D-185		VI	"	4	D	Sta. 7+15, Sta. 104+00 & Sta. 247+00		.02	2-14-18	Day Labor		Bridges	2,689	364	3,053	45	3,098
D-244		VI	"	4	D	Sta. 375+00 & St. 497+00			8-5-19	Day Labor		Culverts	686	2,665	3,351		3,351
D-241		VI	"	4	D	At Livingston		.15	4-13-20	Day Labor		Concrete Shoulders					
D-79	203	VI	Mono	23	A	Southerly Boundary	Sherwin Hill	5.80	10-4-15	Day Labor	C. C. Boyer	Grading	41,998	3,173	45,171	3,329	48,498
D-101		VI	"	23	B	Sherwin Hill	Whiskey Canyon	.80	4-1-16	Day Labor	C. C. Boyer	Grading	10,691	1,752	12,443	568	13,011
D-128		VI	"	23	B	Knot Creek Bridges			1-15-17	Day Labor	C. C. Boyer	Concrete Bridges	6,995	1,897	8,892		8,892
D-191		VI	"	23	B	Knot Creek Canyon		3.28	4-30-18	Day Labor	C. C. Boyer	Widening Curves, etc.	7,668		7,668	167	7,835
D-129		VI	"	23	C	Hilton & McGee Creeks			3-15-17	Day Labor	C. C. Boyer	Bridges	6,286	890	7,176	304	7,480
D-130		VI	"	23	D	Convict & Hot Creeks			5-15-17	Day Labor	C. C. Boyer	Bridges	10,400	639	11,039	748	11,787
D-197		VI	"	23	E	Station 0+00	Station 10+00	.19	7-15-18	Day Labor		Grading	2,726		2,726	274	3,000
D-103	236	VI	"	23	F	Dead Man Creek	Devils Punch Bowl	5.80	4-24-16	Day Labor	C. C. Boyer	Grading	26,119	1,724	27,843	1,159	29,002
41	52	V	Monterey	2	A	Lagunita	Easterly Boundary	4.34	10-29-13	R. O. Burge	J. C. Olstrom	Grading	33,314	2,307	35,621	3,855	39,476
131	233	V	"	2	A	Salinas	Lagunita	4.98	4-30-15	Burns, Jacinto & DaRosa	Hr. S. Folsom	15 ft. Concrete Base	31,233	16,037	47,270	1,870	49,140
D-61	52	V	"	2	A	Lagunita	Easterly Boundary	4.34	8-19-16	Day Labor	H. S. Folsom	15 ft. Concrete Base	41,252	11,469	52,721	3,008	55,729
137	174	V	"	2	B	Chualar	Salinas	10.22	6-2-15	W.L.Dontanville	C. F. Price	15 ft. Concrete Base	58,238	30,000	88,238	2,954	91,192
134	235	V	"	2	C	Camphora	Chualar	10.95	7-2-17	Palmer & McBryde	K. Hook	15 ft. Concrete Base	63,255	50,226	113,481	4,576	118,057
162	191	V	"	2	D	Greenfield	Camphora	11.24	8-10-15	Highway Pav. & Con.Co.	C. C. Tretten	15 ft. Concrete Base	67,886	39,597	107,073	5,552	112,625
133	25	V	"	2	D&E	3 mi. No. of King City Brg.	Greenfield	7.35	5-8-15	Highway Pav. & Con.Co.	H. Byers	15 ft. Concrete Base	53,906	19,943	73,849	3,282	77,131
D-211		V	"	2	E	Thompsons Gulch Bridge		.32	12-19-18	Day Labor		Grading	1,405		1,405	71	1,476
314	312-329	V	"	2	E-F	San Lucas	Layout #25	11.10	1-2-18	Geo. S. Benson & Sons	R.S.Henderson	15 ft. Concrete Base	106,740	58,600	164,340	4,636	169,976
D-192	392	V	"	2	F	King City Bridge			7-1918	Day Labor		Test Borings	2,760		2,760		2,760
D-307	392	V	"	2	F	Salinas River Bridge		.52	6-18-20	Day Labor		Grading Approaches	4,161	7	4,168	30	4,198
236	313	V	"	2	G	San Ardo	San Lucas	11.04	8-26-18	Frank C. McIntire	G. G. Gale	15 ft. Concrete Base	117,031	72,758	189,788	6,411	196,200
D-188	313	V	"	2	G	San Ardo	San Lucas		2-19-18	Day Labor		Stockpiling Materials	3,693		3,693	209	3,902
132	140	V	"	2	H	3 mi. No. of Bradley	San Ardo	10.88	4-30-15	Frank L. Smith	W. C. Little, Jr.	15 ft. Concrete Base	97,811	29,567	127,378	6,378	133,756
D-200	140	V	"	2	H	3 mi. No. of Bradley	San Ardo (Exceptions)	1.72	4-10-19	Day Labor	K. Hook	15 ft. Concrete Base	20,805	3,173	23,978	2,058	26,036
233	358	V	"	2	I	Southerly Boundary	3 mi. No. of Bradley	10.24	7-19-18	J. L. Connors	K. Hook	15 ft. Concrete Base	191,920	77,663	269,583	5,809	275,392
D-15	140-176	IV	Napa	8	A	Westerly Boundary	Stanley Road	4.25	9-28-14	Day Labor	I.M.Atkinson	15 ft.Conc.Base-Oil Sur.	58,446	16,936	75,382	3,704	79,086
D-222	140	IV	"	8	A	Stanley Road	Napa	2.57	3-27-19	Day Labor	E. K. Donahoe	15 ft. Concrete Base	10,450	14,014	24,464	2,286	26,750
193	197	IV	"	8	B	Napa	Easterly Boundary	8.63	7-2-17	Worswick Const. Co.	Hal J. Sams	15 & 16 ft. Conc. Base	59,884	69,296	129,180	7,797	136,919
D-283	318	III	Nevada	17	A	Southerly Boundary	Rattlesnake Creek	9.12	10-23-19	Day Labor		Stockpiling materials	1,289	211	1,500	14	1,514
269	318-360	III	"	17	A-B	Southerly Boundary	Nevada City	14.80	11-19-17	A. J. Fairbanks	M. T. Heaton	Grading	174,489	26,833	201,322	12,986	213,988
								3.00				Oil Surfacing					
119	149	VII	Orange	23	A	San Juan Capistrano	Galivan	5.57	12-22-14	M. R. Company, Inc.	J. C. Beckjord	15 ft. Concrete Base	38,629	12,902	51,531	2,613	54,144
123	155	VII	"	23	A	Sec. 32, T.8 S., R.7 W.	Serra	3.80	4-6-15	Bradshaw Burns Co.	C. F. James	Grading	33,488	4,451	37,939	3,440	41,379
119	149	VII	"	23	A	Easterly Boundary	Sec. 32, T.8 S., R.7 W.	3.56	10-24-14	Day Labor	J. C. Beckjord	15 ft. Concrete Base	24,444	15,451	39,895	1,019	40,914
119	149	VII	"	23	A	Serra	San Juan Creek	2.53	1-8-15	Day Labor	J. C. Beckjord	15 ft. Concrete Base	16,415	10,174	26,589	1,329	27,918
126	163	VII	"	23	A	Galivan	Southerly Boundary	15.08	6-2-15	Day Labor		Detours	2,288		2,288	288	2,576
D-66	155	VII	"	2	A	Sec. 32, T.8 S., R.7 W.	Serra	3.07	8-24-15	Day Labor	J. C. Beckjord	15 ft. Concrete Base	12,309	9,718	22,027	468	22,495
D-76	155-163	VII	"	2	A	Southerly Boundary	San Juan Creek	8.82		Day Labor	C. N. Linley	Oil Surfacing	8,344	5,346	13,690	274	13,964
D-160	155	VII	"	2	A	Near Serra		.40	9-24-17	Day Labor		15 ft. Concrete Base	1,405	1,083	2,488	113	2,601
97	116	VII	"	2	B	Galivan	Irvine	9.37	8-26-14	E. R. Davisson Con.Co.	O.F.Spellmeyer	15 ft. Concrete Base	69,798	26,217	96,015	5,138	101,153
252	116	VII	"	2	B	Galivan	Irvine	9.37	9-3-19	Geo. H. Curtis	L. M. Emmson	Topsoil Sur. & Conc.Shld.	86,439	19,616	106,055	2,197	108,252
D-77	116	VII	"	2	B	Galivan	Irvine	9.37		Day Labor	J. H. Kreitler	Oil Surfacing	2,112	2,426	4,538	683	5,221
D-164	116	VII	"	2	B	Alise Creek Bridge		.01	10-14-17	Day Labor		Concrete Pile Trestle	1,858	930	2,788		2,788
98	120	VII	"	2	C	Irvine	Santa Ana	7.40	9-10-14	Whitg & Caskill	John C. More	15 & 16 ft. Conc. Base	37,866	16,776	54,641	3,651	58,292
D-58	120	VII	"	2	C	Irvine	Santa Ana	7.40		Day Labor	J. H. Kreitler	Oil Surfacing	2,814	3,090	5,904	693	6,597
D-12	48	VII	"	2	D	Santa Ana	Anaheim	4.94	8-13-14	Day Labor	Geo. H. Brown	Topsoil Surfacing	4,561	12,236	16,816	364	17,180
D-224	48	VII	"	2	D	Santa Ana	Station 3+00	.06	3-26-19	Day Labor	Wm. F. Bixby	18 ft. Concrete Base	703	647	1,350	24	1,374
46	48-49-50	VII	"	2	D&F	Santa Ana	Northerly Boundary	11.16	10-29-13	Connor Const. Co.	Geo. H. Brown	16 ft. Concrete Base	61,994	32,630	94,624	5,672	100,296
D-208	49	VII	"	2	E	Anaheim	Fullerton	1.51	10-20-14	Day Labor	Geo. H. Brown	Topsoil Surfacing	3,288	4,124	7,412	444	7,856
D-29	50	VII	"	2	F	Fullerton	Northerly Boundary	4.78		Day Labor	Geo. H. Brown	Oil Surfacing	3,319	2,318	5,637	883	6,520

* Completed but bill not yet rendered.

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COMPLETED CONTRACTS, JUNE 30, 1920.

Con.No.	L.O. No.	Div.	County	Rte.	Sec.	From	To	Length (Miles)	Contract Date	Contractor	Res. Engineer	Type of Work	Final Estimate Work	Materials	Total	Engr. during Const.	Total
13	15	III	Placer	3	A	Southerly Boundary	Lincoln	9.90	9-25-12	Burns, Clark & De Rosa	J. L. Piper	15 ft.Conc.Base-Oil Sur.	68,792	25,336	94,161	8,185	102,366
165	229	III	"	3	A	Andora Under Pass		.12	4-16-15	Rose Construction Co.	C. H. Hutts	Subway & Conc.Base Approa.	1,668	2,002	3,670	920	4,590
156	205	III	"	3	A	Lincoln	Northerly Boundary	6.87	11-9-15	C.H. & A. W. Gorrill	J. L. Piper	15 ft. Concrete Base	46,444	35,963	82,407	5,627	88,034
D-144		III	"	3	B	Yankee Slough Bridges (1 & 2				Day Labor	C. H. Hutts	Grading	424		424		424
D-200	205	III	"	3	B	Ahart, Ewing & Yankee Slough	Bridges	.44	3-26-19	Day Labor	C. F. Reintzs	15 & 20 ft. Conc. Base.	5,307	976	6,283	875	7,158
168	220	III	"	17	A	Roseville	Penryn	7.52	7-10-16	A. C. McLean Const. Co.	R. B. Hatchet	15 ft. Concrete Base	39,140	25,624	63,964	4,040	68,004
D-220	350	III	"	17	A	Through Rocklin		1.15	3-2-19	Day Labor	J. C. North	15 ft. Concrete Base	14,514	10,158	24,672	2,186	26,858
D-247	220	III	"	17	A	Station 4529+47	Station 524+00	1.35	8-6-19	Day Labor	J. C. North	15 ft. Concrete Base	10,148	9,703	19,848	1,645	21,493
124	216	III	"	17	B	Penryn	Auburn	6.48	1-11-16	A. C. McLean Const. Co.	S.J.Treadaway	15 ft. Concrete Base	39,397	28,246	67,643	4,901	72,544
43	53	VII	Riverside	19	A	Westerly Boundary	Riverside	9.38	10-29-13	M. E. Company, Inc.	C. H. Hendries	18 ft. Concrete Base	49,881	22,091	71,612	4,886	76,498
D-47	53	VII	"	19	A	Westerly Boundary	Riverside	3.968	4-16-15	Day Labor	C. H. Hendries	Oil Surfacing	3,719	3,626	7,345	498	7,843
D-227		VII	"	28&29	A	City of Indio		.71	4-2-19	Day Labor	C. H. Hutts	15 ft. Concrete Base	9,089	5,088	14,177	1,136	14,313
D-210	344	VII	"	28	F	N.W.Cor. Sec.20,T.6 S.,R.8E.	N.E.Cor.Sec.6,T.7 S.,R.8 E.	3.01	11-25-18	Day Labor	W. F. Bixby	15 ft. Concrete Base	36,917	22,088	58,996	927	59,912
12	14	III	Sacramento	3	A	Auburn Road	Northerly Boundary	1.85	9-25-12	Burns, Clark & De Rosa	W. P. Ireland	15 ft.Con.Base-Oil Sur.	10,691	4,833	15,774	2,730	18,444
112	128	III	"	4	A	Folsom	Easterly Boundary	6.23	11-10-14	A.W. & C.H. Gerrill	J. L. Piper	12 ft. Concrete Base	41,206	24,184	64,490	4,348	68,838
D-71	128	III	"	4	A	Folsom	Easterly Boundary	6.23		Day Labor	W. H. Miller	Oil Surfacing	2,211	2,211	4,422	93	4,515
D-222	189	III	"	11	B	Through Folsom		.27		Day Labor	J. A. McDavitt	15 ft. Concrete Base	2,447		2,447		2,447
D-109		III	"			State Fair Grounds, Sacramento		.14		Day Labor		Demonstration Road	736	24	760	75	835
D-293		III	"			Sacramento			12-15-19	Day Labor		Maint. Bldg. & Shop Site	17,101	568	17,669	20	17,679
42	51	V	San Benito	2	A	Westerly Boundary	San Juan Bautista	4.22	10-29-13	E. O. Burge	J.C. Alstrom	Grading	44,645	2,783	47,428	3,363	50,791
D-8	51	V	"	2	A	San Juan Bautista	Northerly Boundary	4.98	9-1914	Day Labor	" Peck	15 ft. Con.Base-Oil Sur.	45,004	21,988	66,992	4,014	71,006
D-48	51-225	V	"	2	A	Westerly Boundary	San Juan Bautista	5.21	12-7-15	Day Labor	H. S. Tolen	15 ft. Concrete Base	46,183	1,616	47,799	4,141	51,940
D-89	225	V	"	2	A	Through San Juan Bautista		.80	12-7-15	Day Labor	H. S. Tolen	15 ft. Con.Base-Oil Sur.	6,163	3,016	9,179	549	9,728
46	59	VII	Sanbernardino	9	A	Upland	Citrus Avenue	10.36	11-21-13	Hodson-Johnson Con.Co.	C. H. Hendries	18 ft. Con.Base-Oil Sur.	58,373	14,758	73,130	4,146	77,276
36	43-46	VII	"	9	B-C	Citrus Avenue	San Bernardino	5.68	8-11-13	C. Plower	C. H. Hendries	18 ft. Con.Base-Oil Sur.	34,172	14,189	48,361	4,484	52,845
D-169		VII	"	9	C	At Lytle Creek		1.03	6-14-17	Day Labor	W. F. Bixby	Bridge Extension	2,452	1,268	3,720	220	3,940
35	74	VII	"	9	D	Westerly Boundary	Upland	1.68	2-26-14	Louis Ferrell	C. H. Hendries	18 ft. Concrete Base	16,256	6,242	22,498	2,250	24,748
D-45	74	VII	"	9	D	Westerly Boundary	Upland	1.69		Day Labor	C. H. Hendries	Oil Surfacing	942	741	1,683	23	1,706
D-186	342	VII	"	9	D	Through Upland		.56		Day Labor	C. W. Monroe	18 ft. Concrete Base	2,348	3,047	5,395	56	5,451
37	43-44	VII	"	19	A-B	Westerly Boundary	Southerly Boundary	6.61	7-23-13	Bent & Pennybaker	L. H. Lathrop	18 ft. Con.Base-Oil Sur.	38,432	18,888	58,320	4,248	62,568
D-24		VII	"	19	B	Ontario	Southerly Boundary	.13		Day Labor	L. H. Lathrop	18 ft. Con.Base-Oil Sur.	997	736	1,733	15	1,748
7	7	VII	San Diego	2	A	San Diego	Encinitas	8.42	8-27-12	M. L. Curtis & Co.	A. W. Allen	15 ft. Con.Base-Oil Sur.	55,501	14,137	69,638	3,929	73,567
D-238	416	VII	"	2	A	At Escondido Creek Bridge		.04	1-22-20	Day Labor	W.J.Bessington	15 ft. Con.Base	1,092	100	1,192	73	1,265
30	26	VII	"	2	B	Encinitas	Oceanside	10.63	5-21-13	J. M. Montgomery	A. W. Allen	15 ft. Concrete Base	60,308	23,840	84,148	4,017	88,165
221	340	VII	"	2	B	Through City of Oceanside		1.97	3-13-18	R. S. Dronberg	Wm. F. Bixby	15 & 20 ft. Conc. Base	12,561	6,240	18,801	1,242	20,043
D-11	26-47	VII	"	2	B-C	Encinitas	Las Flores	18.48		Day Labor	C. W. Ainley	Oil Surfacing	12,308	17,088	29,396	1,306	30,702
39	47	VII	"	2	C	Oceanside	Las Flores	8.03	9-24-13	C. L. Hyde Const. Co.	A. W. Allen	15 ft. Concrete Base	48,238	20,471	68,709	2,974	72,043
D-167		VII	"	2	C	At Las Flores Creek Bridge				Day Labor	C. W. Monroe	Grading	123		123		123
D-237		VII	"	2	C	At San Margarita River Bridge		.08	6-11-19	Day Labor	C. W. Monroe	Grading	2,378		2,378	7	2,385
58	76	VII	"	2	D	Las Flores	Westerly Boundary	11.14	4-22-14	W. A. Perry	C. W. Ainley	18 ft. Concrete Base	77,883	29,607	107,490	8,636	116,126
D-58	76	VII	"	2	D	Las Flores	Westerly Boundary	11.14		Day Labor	C. W. Ainley	Oil Surfacing	9,706	5,802	15,508	130	15,638
D-80	76	VII	"	2	D	At Sta. 0+00 & Sta. 9+97		.06	10-28-15	Day Labor	J. G. Peckford	15 ft. Concrete Base	7,220	449	7,669	293	7,962
52	74	VII	"	12	A	East San Diego	La Mesa	1.56	4-22-14	C. L. Hyde Const. Co.	J. S. Gripper	15 ft. Concrete Base	16,815	6,649	19,464	1,581	21,045
217	331	VII	"	12	A	Through East San Diego and	La Mesa	4.15	1-24-18	David H. Ryan	C. C. Holster	15 ft. Concrete Base	44,682	11,729	56,381	2,012	58,393
D-28	77-108	VII	"	12	A-B	East San Diego	El Cajon	3.82	1-22-15	Day Labor	J. W. Cummings	Oil Surfacing	3,540	1,366	5,006	551	5,557
94	108	VII	"	12	B	La Mesa	El Cajon	1.56	8-26-14	C. L. Hyde Const. Co.	J. S. Gripper	15 ft. Concrete Base	12,764	4,116	16,880	952	17,832
223	345	VII	"	12	B	Through El Cajon		2.41	4-10-18	W.E.Hall & R.L.Rockwell	C. O. Kolster	15 & 20 ft. Conc. Base	21,945	9,388	31,470	1,219	32,689
D-93	224	VII	"	12	C	El Cajon	Flinn Springs	7.25	12-6-17	Day Labor	J. G. Peckford	15 ft. Conc. Base	33,081	44,834	77,915	1,920	79,835
D-120	422	VII	"	12	C	Station 530+00	Station 688+00	3.18	3-3-19	Day Labor	J. G. Peckford	Grading	2,341	4,201	6,542	212	6,754
D-161	422	VII	"	12	C	Station 424+34.46	Station 756+58	3.26	1-28-18	Day Labor	W. E. Eaton	Grading	19,451	1,126	20,577	1,104	21,681
204	256	VII	"	12	D	Guatay Creek	Pine Valley	4.65	3-11-17	F.W. Ladbetter	C. F. Montgomery	Grading	24,100	2,335	26,435	2,678	29,113
219	330	VII	"	12	D	3 miles East of Willows	Sweet Water River	2.74	3-13-18	Maurice Ryan	C.F. Montgomery	Grading	13,342	4,015	14,357	2,736	17,093
D-106	330	VII	"	12	D	Viejas Creek	Guatay Creek	2.36	7-26-16	Day Labor	J. G. Peckford	Grading	23,822	2,780	26,602	1,011	27,613
D-166	330	VII	"	12	D	At Viejas Creek Bridge and	near Station 177+00		10-6-17	Day Labor	W. E. Eaton	Grading	8		8		8
D-180	330-422	VII	"	12	D	1 mile West of Alpine	Viejas Creek	2.65	1-16-18	Day Labor	W. E. Eaton	Grading	8,161	2,640	10,801	397	11,198
D-253		VII	"	12	D	At Sweet Water River Bridge			8-22-18	Day Labor	C. W. Monroe	Grading	693		693	9	702
203	400	VII	"	12	E	Station 1+00	Sta. 192+56-Cottonwood Cr.	.28	3-13-18	Day Labor	W. E. Eaton	Grading	8,699	124	8,823	233	9,056
D-279	405-344	III	Sanjoaquin	4	A	Stanislaus River Bridge		.28	10-23-19	Day Labor		Topeka Surface	834	1,823	2,657	136	2,793
D-239	367	III	"	4	B	Manteca	Stockton	.60	7-16-19	Day Labor	F. C. Hewitt	15 ft. Concrete Base	5,437	5,224	10,661	171	10,832
D-240	385	III	"	4	B	Manteca	French Camp	2.80	7-16-19	Day Labor	F. C. Hewitt	15 ft. Concrete Base	36,822	22,822	59,644	1,822	61,466
D-252	209	III	"	5	E	Paradise Cut Bridge		.36	9-23-19	Day Labor		Grading	1,069	51	1,120		1,120

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COMPLETED CONTRACTS, JUNE 30, 1920.

Con. No.	L.O. No.	Div.	County	Rte.	Sec.	From	To	Length (Miles)	Contract Date	Contractor	Res. Engineer	Type of Work	Final Estimate: Work	Material	Total	Engr. during Const.	Total
56	56	V	SanLuisObispo	2	A	Paso Robles	Northerly Boundary	10.63	2-26-14	W. A. Dontanville	C. F. Price	15 ft. Con.Base-Oil Sur.	72,027	55,102	127,129	5,564	132,693
D-136	56	V	"	2	A	At Stations 17-27-43 & 215		.20	6-19-17	Day Labor	J. I. Boaz	15 ft. Concrete Base	2,241	906	3,147	19	3,166
154	122	V	"	2	A	Atascadero Creek	Paso Robles	10.05	9-10-15	J. D. Marsh	S. D. Cowden	15 ft. Concrete Base	69,040	48,490	117,530	5,302	122,832
55	57	V	"	2	C	Santa Margarita	Atascadero Creek	8.35	2-26-14	W. A. Dontanville	E. S. Rust	15 ft. Con.Base-Oil Sur.	64,121	45,285	109,406	3,771	113,177
D-138	57-321	V	"	2	C	At Stations 13-142 & 273		.13	6-19-17	Day Labor		15 ft. Concrete Base	2,078	84	2,162	27	2,189
110	136	V	"	2	D	San Luis Obispo Creek	Cuesta	3.60	10-20-14	Enoch J. Hunt	W. B. Parch	Grading	52,582	6,189	58,771	4,614	63,385
D-3	24	V	"	2	D	San Luis Obispo	Santa Margarita	6.37	7-23-13	Day Labor	B. W. Upson	15 ft. Con.Base-Oil Sur.	65,761	36,479	100,930	6,489	107,419
24	104	V	"	2	E	Arroyo Grande	San Luis Obispo	13.41	7-21-14	Rogers Bros. Co.	L. A. Moore	15 ft. Concrete Base	101,372	80,948	182,320	8,210	190,530
D-49	104	V	"	2	E	Arroyo Grande	San Luis Obispo	13.42		Day Labor	A. A. Peters	Oil Surfacing	8,606	2,890	8,496	127	9,623
D-73	104	V	"	2	E	Arroyo Grande	San Luis Obispo		8-26-15	Day Labor	A. A. Peters	Guard Rail	4,604		4,604	104	4,708
210	265-341	V	"	2	F	Santa Maria River	Arroyo Grande	11.98	11-19-17	W. A. Dontanville	E. Byers	15 ft. Concrete Base	128,827	106,256	235,083	9,357	244,440
D-115	265	V	"	2	F	Santa Maria River	Nipomo	1.98	12-15-16	Day Labor	D. K. Dunshee	Grading	4,908	14	4,922	79	5,001
229	361	V	"	2	C	1 mile N.E. of Shandon	Easterly Boundary	8.91	2-26-19	C. H. Hudson	Andrew Swickhard	Grading	69,537	7,977	77,514	3,814	81,328
D-184	361	V	"	2	C	At Station145+50			2-8-18	Day Labor		Test Borings	30		30		30
1	1	IV	San Mateo	2	A	So. San Francisco	Burlingame	5.41	7-23-12	F. R. Ritchie	Leon L. Clarke	24 ft. Asphalt on Conc.	92,809	135	93,004	3,968	97,002
28	23	IV	"	2	A	Northerly Boundary	South Line of Daly City	1.02	4-23-13	Flynn & Treacy	A. C. Saxe	24 ft. Topeka on Conc.	14,569	6,302	20,891	2,937	23,828
29	23	IV	"	2	A	Oak Grove Drive	Hallevegs Drive,Burlingame	.22	4-23-13	Clarke & Henry Con.Co.	Leon L. Clarke	24 ft. Topeka on Conc.	4,166	1,262	5,467	614	6,081
34	23	IV	"	2	A	Cypress Lawn Cemetery	South San Francisco	2.07	4-23-13	Mahoney Bros.	H. P. Holley	Grading	22,853	5,275	27,960	2,639	30,599
54	58-75	IV	"	2	A	Daly City	Cypress Lawn Cemetery	4.06	2-26-14	Bates, Borland & Ayer	A. C. Saxe	24 ft. Topeka on Conc.	70,699	23,590	94,289	5,637	99,926
22	22	IV	"	2	B	Redwood City	Southerly Boundary	3.29	3-26-13	S. F. Doyle	Leon L. Clarke	20 ft. Topeka on Macadam	50,991		50,991	2,637	53,628
287	34	IV	"	2	B	San Mateo	Terraford	1.76	4-23-13	Raisch Improvement Co.	Leon L. Clarke	20 ft. Topeka on Macadam	27,826	404	28,230	1,800	30,030
167	239	IV	"	2	B	Terraford	Redwood City	4.24	7-10-16	J. A. Marshall	Clay Anderson	20 ft. Concrete Base	40,474	38,253	78,727	4,638	83,365
D-9	23-63	IV	"	2	B	At San Francisquito Creek		.18		Day Labor	E. Blockley	20 ft. Bituminous Conc.	1,413	4,591	6,004	235	6,239
D-35	22	IV	"	2	B	Redwood City	Southerly Boundary			Day Labor	E. Blockley	Retaining Wall	715	367	1,082	352	1,434
98	105	V	SantaBarbara	2	A	Orcutt	Santa Maria River	6.49	8-26-14	A. S. Bent Const. Co.	E. S. Rust	15 ft. Topeka on Conc.	66,531	32,275	98,806	3,212	102,018
226	122	V	"	2	A	Orcutt	1 mile South of Divide	3.56	9-3-19	Frank C. McIntire	O. G. Gale	15 ft. Concrete Base	43,976	38,027	81,903	3,546	85,449
J-72	105	V	"	2	A	Santa Maria	Santa Maria River	.82	12-30-14	Day Labor	A. A. Peters	Oiled Gravel	700	50	750	22	772
D-243	122	V	"	2	A	Orcutt	1 mile South of Divide		8-5-19	Day Labor		Stockpiling	585	3,659	4,244		4,244
36	41	V	"	2	B	Los Alamos	Bickmell	11.95	7-3-13	Mayer & Lewis	L. W. Moore	15 ft. Con.Base-Oil Sur.	88,431	60,505	148,936	10,482	159,418
184	137	V	"	2	C	Zaca Station	Los Alamos	8.75	6-6-17	W. A. Dontanville	E. Byers	15 ft. Concrete Base	67,452	57,176	124,628	7,779	132,407
D-121	137-183	V	"	2	C-D	Gaviota	Los Alamos		3-19-17	Day Labor	J. I. Boaz	Cattle Passes	1,140	314	1,454	3	1,457
153	192	V	"	2	D	Gaviota Pass	Zaca Station	11.39	8-10-15	C. H. Hudson	W. L. Judkins	Grading	53,714	10,944	64,658	5,123	69,781
176	248	V	"	2	D	At Santa Ynez River		.68	9-11-16	Mercer Fraser Co.	E. E. Brown	Steel Bridge	167,102	7,890	174,992	6,238	181,230
D-135	292	V	"	2	D	At Mojoqui Creek Bridge, Sta.	248+00	.02	6-1-17	Day Labor	J. I. Boaz	Grading Approaches	1,018		1,018	5	1,023
D-118	292	V	"	2	D	Zaca Canyon Bridges		.08	2-13-17	Day Labor	J. I. Boaz	Grading Approaches	3,555	12	3,567	22	3,589
115	136	V	"	2	E	Alcatraz	Las Cruces	4.82	12-8-14	J. W. Calbeck	O. C. Tretten	15 ft. Concrete Base	74,976	29,036	104,012	5,676	109,688
116	273	V	"	2	E	Las Cruces	Gaviota Pass	2.53	5-22-17	Wm. Hodson	S.S.Henderson	Grading	56,186	9,270	65,456	3,438	68,894
D-124	134	V	"	2	E	At Gaviota Canyon Bridges		.14	1-4-17	Day Labor	J. I. Boaz	Grading Approaches	2,520		2,520	174	2,694
D-140	134-322	V	"	2	E	Alcatraz	Las Cruces	.46	6-19-17	Day Labor	J. I. Boaz	15 ft. Concrete Base	4,409	1,686	6,095	70	6,165
92	115	V	"	2	F	El Capitan Creek	Alcatraz	9.31	8-11-14	T. K. Beard	J. C. Alstrom	Grading	88,030	9,878	97,908	5,747	103,655
197	115	V	"	2	F	El Capitan Creek	Alcatraz	9.24	8-9-17	Tryon & Brain	S. D. Cowden	15 ft. Concrete Base	61,054	63,392	124,446	4,629	129,075
228		V	"	2	F	At Arroyo Honda		.10	7-16-18	W. M. Ledbetter & Co.	S. D. Cowden	Concrete Bridge	51,617	35,402	87,019	2,790	89,809
D-172	327	V	"	2	F	Refugio & Arroyo Honda Bridges			11-23-17	Day Labor		Borings	302		302		302
D-207	327	V	"	2	F	At Canada del Refugio		.02	1-13-19	Day Labor	R. S. Henderson	Concrete Bridge	15,544	7,604	23,148	1,629	24,777
D-213	115-227	V	"	2	F	At Canada del Refugio and Arroyo Honda Bridges			12-28-18	Day Labor		Graveling by-passes	1,266		1,266	18	1,284
D-228	327	V	"	2	F	At Canada del Refugio Bridge			4-2-19	Day Labor		Grading Approaches	3,876		3,876	85	3,961
D-248	115	V	"	2	F	At Refugio & Arroyo Honda Bridges			12-15-19	Day Labor	H. T. Avery	15 ft. Concrete Base	14,443	9,308	23,751	959	24,710
196	248-412-282	V	"	2	G	Elwood	El Capitan Creek	7.70	8-9-17	Tryon & Brain	S. D. Cowden	15 ft. Concrete Base	42,236	38,689	80,925	4,037	84,962
D-141	123	V	"	2	G	At Station 26+50-Near Elwood		.01	6-19-17	Day Labor	J. I. Boaz	15 ft. Concrete Base	62	88	150		150
109	153-124	V	"	2	C-I	El Capitan Creek	Stony Creek	10.20	10-6-14	C. H. Hudson	W. P. Marshall	Grading & 15 ft. ConBase	99,089	22,807	121,896	5,627	127,523
45	56	V	"	2	H	Rincon Creek	Carpinteria Creek	2.35	11-21-13	Occidental Const. Co.	B. W. Upson	15 ft. Concrete Base	22,055	8,125	30,180	3,101	33,281
J-11	56	V	"	2	H	Rincon Creek	Carpinteria Creek	2.22	5-28-17	Day Labor	O. L. Cain	Oil Surfacing	1,297	115	1,412		1,412
D-132	124	V	"	2	I	Stony Creek	Glenn Ann Canyon Road	.84	6-19-17	Day Labor	O. L. Cain	Oil Surfacing	530	119	649		649
D-116	153	V	"	2	J	County Road	Serena Station	.69	9-1914	Day Labor	B. W. Upson	15 ft. Concrete Base	4,830	3,322	8,152	1,220	9,372
D-133	153	V	"	2	J	Near Serena		.69	5-25-17	Day Labor	C. L. Cain	Oil Surfacing	475	91	566		566
D-297	247	V	"	2	J	At Easterly City Limits of	Santa Barbara	.10	1-15-20	Day Labor		20 ft. Concrete Base	1,165	1,032	2,197		2,197
14	8	IV	Santa Clara	2	A	Palo Alto	Stevens Creek Bridge	6.43	10-22-12	City Street Imp. Co.	E. Blockley	20 ft. Topeka on Macadam	103,688	285	103,973	5,619	109,592
15	8	IV	"	2	A	Stevens Creek Bridge	Lawrence Station Road	5.52	10-22-12	A. Teichert & Son	Chas. B. Dugan	20 ft.Con.Base-Oil Surf.	36,110	19,242	54,352	3,065	57,417
32	37	IV	"	2	A	Lawrence Station Road	Santa Clara	1.15	5-21-13	John Doyle	Chas. B. Dugan	20 ft. Con.Base-Oil Sur.	11,240	5,564	16,804	1,947	18,751
86	111	IV	"	2	A	Santa Clara	San Jose	1.93	8-11-14	Ransome Crummey Co.	Leon L. Clarke	24 ft.Topk.on Conc.Base	19,001	26,739	45,740	5,143	51,883
D-10	64	IV	"	2	A	At San Franciscito Creek		.08		Day Labor	E. Blockley	20 ft. Bituminous Conc.	636	2,042	2,678	109	2,787

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COMPLETED CONTR ACTS, JUNE 30, 1920.

Con.No	L.O. No.	Div.	County	Rte	Sec.	From	To	Length (Miles)	Contract Date	Contractor	Res. Engineer	Type of Work	Final Estimate Work	Materials	Total	Engr. Prior Const.	Total
D-157	243	IV	Santa Clara	2	A	San Tomas Aquino Creek	Santa Clara	.49	9-15-17	Day Labor	Chas. P. Dugan	20 ft.Con.Base-Topk.Sur.	4,225		11,208		11,208
25	238	IV	"	2	B	Edenvale	Morgan Hill	12.95	5-26-13	Richard Keatinge & Sons	Chas. P. Dugan	16 ft.Con.Base-Oil Surf.	92,252	44,892	137,144	4,466	141,610
28	368	IV	"	2	B	San Jose	Edenvale	4.38	4-22-13	Richard Keatinge & Sons	Chas. P. Dugan	15&20 ft.Con.Ba-Oil Sur.	20,729	10,298	31,027	1,858	32,885
54	369	IV	"	2	B	San Jose	Walla	1.84	4-22-13	John P. McDonald, Jr.	Chas. P. Dugan	Topeka Surfacing	14,249	994	15,243	588	15,831
D-21	139	IV	"	2	B	At Morgan Hill		.40	11-5-14	Day Labor	H. Hockley	15 ft. Conc. Base	3,290	1,184	4,474	629	5,103
D-125	28-28	IV	"	2	B	Walla	1 mi. No. of Coyote	7.38	4-5-17	Day Labor	C. B. Dugan	Concrete Shoulders	29,568	14,768	44,336		44,336
D-254	29	IV	"	2	B	1 mi. North of Coyote	Perry Station	4.17	9-22-19	Day Labor	I. H. Atkinson	Topk.Surf. & Conc.Shlds.	39,955	20,000	59,955	346	60,301
35	40	IV	"	2	C	Morgan Hill	Gilroy	7.39	7-6-13	J. O. Burge	J. D. Greene	15 ft.Con.Base-Oil Surf.	37,176	13,913	51,089	4,356	55,445
72	295	IV	"	2	C	Gilroy	Sargent	6.07	6-9-14	W.L.Peterson & A.J.Grier	Wm. H. Jasmicke	15 ft.Con.Base	49,953	20,053	70,006	3,316	73,322
D-17	96	IV	"	2	C	Gilroy	Sargent	6.07		Day Labor	Wm. H. Jasmicke	Oil Surfacing	5,397	2,606	7,803	438	8,241
D-19	65	IV	"	2	C	At Llagas Creek		.26	12-31-13	Day Labor	H. Hockley	15 ft. Con.Base-Oil Sur.	6,995	1,886	8,881	1,572	10,453
D-168	167	IV	"	2	C	Appr. to Pajaro River Bridge		.07	9-19-17	Day Labor	C. B. Dugan	Asphaltic Concrete	1,176		1,176		1,176
89	112	IV	"	2	A	Northerly Boundary	San Jose	6.72	9-11-14	John P. McDonald, Jr.	C. B. Dugan	18 ft. Concrete Base	40,345	21,509	61,854	4,722	66,576
D-53	112	IV	"	2	A	Northerly Boundary	San Jose	6.72	9-11-14			Oil Surfacing	3,367	2,968	6,335	97	6,432
D-156	212	IV	"	5	A	At Milpitas		.42	9-15-17	Day Labor		18 ft. Concrete Base	3,634	2,964	6,598		6,598
102	132	IV	"	5	B	Southerly Boundary	Los Gatos	7.59	9-22-14	John A. Marshall	Clay Anderson	Grading	97,198	7,366	104,564	10,377	114,932
142	183	IV	"	5	B	Los Gatos	San Jose	8.89	7-29-15	Marin Rock Company	C. B. Dugan	18 ft. Concrete Base	43,225	37,861	80,987	4,081	85,068
D-78	183	IV	"	5	B	Station 552+00	Station 603+00	.89	10-11-15	Day Labor		Fencing	43		43	4	47
D-134	183	IV	"	5	B	Stevens Creek Road	The Alameda	1.69	5-26-17	Day Labor	C. B. Dugan	Topeka Surface	6,844	956	7,800		7,800
49	68	IV	Santa Cruz	5	A	Easterly Boundary	Glenwood	5.66	2-26-14	Martin Foss & J.A.Marshall	H. W. McCluskey	Grading	73,135	6,377	79,512	7,381	86,893
83	103	IV	"	5	A	Glenwood	Santa Cruz	10.10	7-7-14	Occidental Const. Co.	W. A. Moore	Grading	98,653	4,719	103,372	12,622	115,994
218	103	IV	"	5	A	1 mi. So. of Glenwood	Santa Cruz	6.73	3-19-18	Federal Const. Co.	Leon L. Clarke	16 & 17 ft. Conc.Base	192,396	82,312	274,708	5,936	280,644
343	103	IV	"	5	A	Glenwood	Sandhill School	3.16	5-25-19	J.A.Marshall & J.S.Baker	J. D. Greene	15 & 17 ft. Conc. Base	72,379	27,658	99,041	4,070	56,911
200	419	II	Shasta	3	A	At Cottonwood Creek		.11	8-28-17	Tiesiam Bros.	H.Q.Sullivan	Concrete Bridge	56,883	15,796	71,179	5,286	76,465
144	166	II	"	3	A	At Pit River		.07	7-30-15	Rose Construction Co.	C. E. Smith	Concrete Bridge	262,963	14,983	277,946	8,496	286,471
202	297	II	"	3	B	Redding	Bayha	10.83	9-11-17	Palmer & McBryde	J. H. Bidwell	Concrete Bridges	82,678	34,098	116,776	11,498	128,274
225	295	II	"	3	B	At Saltmar, Boulder, Salt, Moody, Spring & Churn Crks.		.09	7-2-18	deHeard Brothers	C. S. Haig	Concrete Bridges	25,676	10,178	35,854	3,414	39,268
D-47	182	II	"	3	B	Approach to Sacramento River Bridge at Redding		.09	6-25-15	Day Labor	B. L. Breed	Grading	2,547	539	3,086	183	3,269
85	98-101	II	"	3	B-C	Bayha	Sacramento River	16.21	7-21-14	Palmer & McBryde	C. E. Smith	Grading	219,448	13,094	232,542	20,524	253,066
174	236	II	"	3	C	At Salt Creek & Sacramento River		.13	7-28-16	Ross Construction Co.	H. H. Soult	Concrete Bridges	25,024	14,989	40,013	1,123	41,136
199	293	II	"	3	C	Sacramento River	La Moine	13.31	8-28-17	J. F. Fitzpatrick	J. W. Lowden	Grading	186,580	19,012	205,593	22,004	227,597
D-179	293	II	"	3	C	At Hinte & Doney Creeks			7-27-19	Day Labor	J. W. Lowden	Reinforced Conc.Bridges	9,782	1,932	11,714	14	11,728
75	85	II	"	3	D	La Moine	Hazel Creek	9.92	6-9-14	F. Rolandi	M. J. Bassett	Grading	91,332	8,365	99,697	11,244	110,931
145	167	II	"	3	D	At Boulder & Shotgun Creeks		.13	7-20-15	F. Rolandi	M. J. Bassett	Concrete Bridges	5,393	3,715	9,108	672	9,780
187	278	II	"	3	D	Hazel Creek	Northerly Boundary	11.28	6-6-17	Connors-Green & Co.	M. J. Bassett	Grading	163,497	13,228	176,715	18,053	194,768
254	278	II	"	3	D	At Castle, Negro & Flume Creeks		.04	6-5-19	Hay & Soult	M. J. Bassett	Concrete Bridges	13,167	5,342	18,509	1,033	19,542
D-63	167	II	"	3	D	At Boulder & Shotgun Creek Bridges			11-10-15	Day Labor		Grading Approaches	360		360	14	374
100	130	II	Siskiyou	3	A	Weed	Dunsmuir	16.60	9-22-14	Toohey & Johnson	H. C. Boyden	Grading	88,664	6,097	94,761	9,344	104,105
155	310	II	"	3	A	Across Sacramento River at Dunsmuir		.10	8-24-15	F. H. Greene	H. H. Soult	Concrete Bridge	26,946	18,472	45,418	1,665	47,083
196	320	II	"	3	A	Dunsmuir	Southerly Boundary	1.92	8-26-18	Connors-Green & Co.	M. J. Bassett	Grading	23,103	1,134	24,237	1,207	25,444
D-74	320	II	"	3	A	Dunsmuir	½ mile south of Dunsmuir	.30	6-8-17	Day Labor	Leigh Brown	Grading	2,303	312	2,615	820	10,235
190	320-403	II	"	3	A-B	At Greenhorn, Trekm & Little	Castle Creeks	.04	5-22-17	John H. May	M. H. Soult	Concrete Bridges	6,509	3,504	10,013	794	10,807
D-169	402	II	"	3	B	At Treka & Greenhorn Creek Bridges			10-22-17	Day Labor		Grading Approaches	2,116	67	2,183	57	2,240
56	84	II	"	3	C	Hornbrook	Oregon Line	8.03	5-27-14	Hagen & Pradenburgh	M. W. Lowden	Grading	37,781	6,444	44,225	8,770	52,995
118	145	II	"	3	C	Hornbrook	Trekm	16.92	12-23-14	E. T. Johnson	M. W. Lowden	Grading	134,886	11,811	146,697	23,439	170,136
D-99	84-145	II	"	3	C	Trekm	Oregon Line	.38	3-16-16	Day Labor	M. W. Taylor	Grading	3,139		3,139	366	3,505
D-152	84	II	"	3	C	Oregon Line	44 Miles South	4.50	8-2-17	Day Labor	M. J. Tilley	Gravel Surface	42,132		42,132	500	42,632
79	79	III	Solano	7	A	Benicia	24 miles South of Cordelia	9.05	6-9-14	Cosmary,Peterson Co.,Inc.	S. J. Treadaway	15 ft. Concrete Base	54,310	40,703	95,013	7,922	102,935
114	144	III	"	7	B	2½ miles So. of Cordelia	Fairfield	8.13	11-20-14	P. H. Roare	M. A. Beaton	15 ft. Concrete Base	39,996	31,670	71,666	3,953	75,619
D-56	144	III	"	7	B	2½ miles So. of Cordelia	Fairfield	8.06		Day Labor	C. A. Havilland	Oil Surfacing	1,674	2,000	3,674	193	3,867
D-126	369	III	"	7	B	At Suisun Creek & Station 790		.07	5-2-17	Day Labor	C. A. James	15 ft. Con.Bs.-Con.Brid	1,321	2,091	3,412	434	3,846
74	94	III	"	7	C	Fairfield	Vacaville	8.83	6-9-14	Cosmary,Peterson Co.,Inc.	A. T. Howe	15 ft. Con.Base-Oil Surf.	57,255	41,195	98,450	5,319	103,769
111	127	III	"	7	D	Vacaville	Batavia	8.24	11-10-14	P. L. Barr	L. P. Vaile	15 ft. Concrete Base	53,455	30,798	84,253	5,582	89,835
186	273	III	"	7	E	Batavia	Putah Creek	9.35	6-6-17	T. W. Olney	H. A. Matchet	15 ft. Concrete Base	44,360	44,186	88,546	6,195	94,743
183	269	III	"	8	A	Westerly Boundary	Cordelia	3.29	5-22-17	Harlan & Harlan	C. M. Batts	15 ft. Concrete Base	32,790	20,108	52,898	5,229	61,128
D-212	269	III	"	8	A	Westerly Boundary	Cordelia	.44	12-27-18	Day Labor		Guard Rail	1,478		1,478	225	1,703
68	88	IV	Sonoma	1	A	Northerly Boundary	Cloverdale	4.29	5-27-14	Hard Brothers	O. J. Jade	Grading	52,392	3,361	55,753	7,892	63,645
16	16-83	IV	"	1	B	Healdsburg	Santa Rosa	13.45	10-22-12	Richard Keatinge & Sons	I. H. Atkinson	15 ft.Con. Base-Oil Sur.	134,028	64,051	198,079	8,740	206,819
D-22	16	IV	"	1	B	½ mile So. of Healdsburg		.04	10-20-14	Day Labor		Gravel Surface	116		116	70	186
D-87	16	IV	"	1	B	Station 130+86.7	Station 144+78.3	.26	9-2-15	Day Labor	J. J. Stoddard	15 ft. Concrete Base	11,321	1,661	12,982	1,441	14,423
D-96	223	IV	"	1	B	Healdsburg	Russian River	.58	12-17-15	Day Labor	C. C. Cottrell	15 ft. Concrete Base	10,767	4,190	14,957	115	15,072

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COMPLETED CONTRACTS, JUNE 30, 1920.

Con.No.	L.O. No.	Div.	County	Rte.	Sec.	From	To	Length (Miles)	Contract Date	Contractor	Res. Engineer	Type of Work	Final Estimate Work	Final Estimate Materials	Final Estimate Total	Engr. during Const.	Total
129	159	IV	Sonoma	1	C	Willow Brook	Southerly Boundary	6.44	4-30-15	Twohy Brothers Co.	A. C. Saxe	15 ft. Conc. Base	45,668	28,123	73,791	4,405	78,196
177	251	IV	"	1	C	Highland Avenue	Willow Brook	3.60	10-11-16	J. C. Price & Co.	L.C. Tinkelman, Jr.	Grading	18,707	3,067	21,774	3,291	25,065
206	261-300	IV	"	1	C	Santa Rosa	Willow Brook	12.42	10-17-17	Municipal Improvement Co.	C. F. Price	15 ft. Conc. Base	198,228	70,446	268,674	10,678	279,352
158	241-194	IV	"	8	A	Reclamation	Fairville	7.05	11-25-15	Bates, Borland & Ayer	J. D. Greene	Grading	47,576	4,667	52,243	4,065	56,307
D-112	194-241	IV	"	8	A	Station 52+22	Station 394+00	6.25	9-9-16	Day Labor	C. C. Cottrell	Gravel Surface	3,277	3,740	7,017	127	7,144
D-123	194-241	IV	"	8	A	Petaluma Creek	Sonoma Creek	11.31	4-4-17	Day Labor	C. C. Cottrell	Grading	932		932		932
D-62	194-195	IV	"	8	A-B	Sonoma Creek	Easterly Boundary	2.32	8-24-15	Day Labor	I. W. Atkinson	Grading	18,926	1,019	20,115	1,630	21,745
D-285		IV	"			At Petaluma Maint. Yard			11-13-19	Day Labor	J. D. Greene	Maintenance Building	5,217	5,121	10,338	1,167	11,505
163	96-241	IV	Sonoma-Marin	8	A	See Contract No. 163, Mrn-Son-8-A											
D-282		IV	"	8	A	See D-282, Mrn-Son-8-A											
5	5-18-31	III	Stanislaus	4	A	Southerly Boundary	Ceres	12.04	8-27-12	E. O. Burge	J. F. Piper	15 ft. Con.Base-Oil Sur.	66,072	23,153	89,225	4,290	93,515
D-189	5	III	"	4	A	At Turlock City Limits			4-10-18	Day Labor		Asphalt Concrete	217		217		217
26	30	III	"	4	B	Ceres	Northerly Boundary	9.61	3-25-13	Considine & Bates Co.	R. H. Hatchet	15 ft. Con.Base-Oil Sur.	33,447	37,003	70,450	7,551	78,001
D-122	30	III	"	4	B	At Tuolumne River Bridge		.02	3-21-17	Day Labor		15 ft. Concrete Base	461		461		461
222	204-338	III	"	13	A	At Riverbank		.69	4-10-18	Alfred H. Vogt	J. A. McDavitt	Bridge-12 ft. Conc. Base	16,424	8,177	24,601	1,154	25,755
D-50	204	III	"	13	A	Salida	Oakdale	13.61		Day Labor	W. A. Mason	12 ft. Concrete Base	61,130	41,437	102,567	5,238	107,805
D-29	164	III	"	13	B	Knights Ferry Road	Easterly Boundary	1.32	10-20-14	Day Labor	H. C. Darling	Grading	6,342	252	6,594	139	6,733
121	150	III	Sutter	3	A	Tuba City	Northerly Boundary	11.70	1-19-15	Forest City Pav.&Con.Co.	C. H. Butts	15 ft. Concrete Base	50,947	45,197	96,144	5,438	101,582
135	169	II	Tehama	3	B	Proberta	Red Bluff	6.38	6-1--15	Hoffman & McLaren	E. O. Sullivan	15 ft. Concrete Base	40,633	16,700	57,333	4,633	61,966
162	221-222	II	"	3	B	Corning	Proberta	9.75	1-11-16	Taylor & Berliner	E. O. Sullivan	15 ft. Concrete Base	54,958	26,476	81,434	4,881	86,315
142	170	II	"	3	C	Red Bluff	Northerly Boundary	12.74	7-20-15	James Fitzpatrick	J. A. McDavitt	Grading	45,786	4,393	50,179	5,237	55,416
76	86	II	"	7	A	Southerly Boundary	Corning	8.91	6-9--14	Murray, Jacinto & DeRosa	E. O. Sullivan	15 ft. Concrete Base	58,267	20,307	78,574	5,468	84,042
D-51	86	II	"	7	A	Southerly Boundary	Corning	3.23		Day Labor	J. T. Haviland	Oil Surfacing	2,739	633	3,372		3,372
185	280	VI	Tulare	4	A	Earlimart	Pixley	5.87	6-6-17	Geo. S. Benson & Sons	J. J. Chite	15 ft. Concrete Base	36,976	25,722	62,698	1,873	64,571
190	279	VI	"	4	A	Southerly Boundary	Earlimart	6.52	4-6-17	The M. R. Co., Inc.	R. C. Myers	15 ft. Concrete Base	39,712	32,364	72,076	2,246	74,322
196	287-288	VI	"	4	A-B	Pixley	Tipton	6.56	7-8-17	Leigh G. Garnsey	R. S. Badger	15 ft. Concrete Base	39,603	31,521	71,124	2,356	73,480
196	286	VI	"	4	B	Tipton	Tulare	9.18	7-2-17	T. E. Shafer	R. S. Badger	15 ft. Concrete Base	76,902	45,920	122,822	6,896	129,718
189	276	VI	"	4	C	½ Mile West of Visalia	Tulare	9.16	6-6-17	J. H. Shafer	A.F.Garlinghouse	15 ft. Concrete Base	56,209	47,127	103,336	5,829	109,165
149	178-179	VI	"	4	B	Goshen	Visalia	6.42	8-10-15	White & Gaskill	A.F.Garlinghouse	15 ft. Concrete Base	34,645	27,293	61,938	4,094	66,032
125	71	VI	"	4	B	Traver	Northerly Boundary	5.20	4-16-15	W. A. Kettlewell & Sons	C. Y. James	15 ft. Concrete Base	24,502	17,808	42,310	3,911	46,221
126	71	VI	"	4	B	Goshen	Traver	8.47	4-16-15	W. A. Kettlewell & Sons	C. Y. James	15 ft. Concrete Base	38,098	29,888	67,986	3,311	71,297
D-94	71	VI	"	4	B	Traver	Northerly Boundary	5.35	1-7--16	Day Labor	E. J. Pardee	Oil Surfacing	660	731	1,391	73	1,464
D-142	71-336	VI	"	4	B	At Kings River Bridge		.25	6-26-17	Day Labor		15 ft. Concrete Base	1,297	343	1,640	5	1,645
148	175	VI	"	10	A	Westerly Boundary	Near Goshen	3.94	8-10-15	White & Gaskill	A.F.Garlinghouse	15 ft. Concrete Base	14,437	15,006	29,443	2,158	31,601
D-6	67	III	Tuolumne	13	A	Westerly Boundary	Keystone	10.84		Day Labor	H. C. Darling	Grading	68,367	2,722	71,089	2,687	73,776
D-33	218	III	"	13	B	Keystone	Sonora	11.01	3-26-15	Day Labor	H. C. Darling	Grading	41,779	3,597	45,376	2,640	48,016
31	36	VII	Ventura	2	A	Southerly Boundary	Newbury Park	7.34	5-21-13	Leigh G. Garnsey	H. R. Postle	15 ft. Concrete Base	52,692	22,472	75,164	4,126	79,290
D-13	36	VII	"	2	A	Southerly Boundary	Newbury Park	7.34		Day Labor	H. R. Postle	Oil Surfacing & Shoulders	13,947	2,878	16,825	452	17,277
81	107	VII	"	2	B	Newbury Park	Springville	11.16	7-7--14	Leigh G. Garnsey	Chas. O. Kolster	15 ft. Con.Base-Oil Sur.	82,272	30,066	112,338	8,040	120,378
175	107	VII	"	2	B	At Arroyo Calleguas		.01	7-29-16	Munoz & Munoz	L. W. Cummings	Concrete Bridge	3,280	1,234	4,514	678	5,192
D-171	107	VII	"	2	B	At Arroyo Calleguas Bridge		.02	11-17-17	Day Labor		Channel Protection	2,900	729	3,629	10	3,639
171	237	VII	"	2	C	Springville	Santa Clara River	5.63	7-10-16	Modern Construction Co.	L. W. Cummings	15 ft. Concrete Base	31,565	14,842	46,407	2,931	49,338
198	262-277	VII	"	2	C	Santa Clara River	Ventura	4.16	6-6--17	Conner Contracting Co.	J. C. Mora	15 ft. Concrete Base	29,366	15,663	45,029	6,041	51,070
52	72-73	VII	"	2	D-E	Ventura	Sea Cliff	8.02	2-26-14	Carl Lenardt	H. H. East	15 ft. Concrete Base	101,296	34,296	135,592	4,458	140,050
D-34	72-73	VII	"	2	D-E	Ventura	Sea Cliff	8.02		Day Labor	H. H. East	Oil Surfacing	3,628	2,067	5,695	771	6,466
D-1	13	VII	"	2	F	Sea Cliff	Rancho El Rincon	1.29	9-28-12	Day Labor	H. H. East	Sea Walls & Trestle	21,623	2,216	23,839	9,077	32,916
73	13-83	VII	"	2	F-G	Benham	Westerly Boundary	3.70	6-9--14	Modern Const. Co., Inc.	H. H. East	15 ft. Conc.Base	52,471	18,620	71,091	3,468	74,559
D-43	13-83	VII	"	2	F-G	Benham	Westerly Boundary	4.36		Day Labor	H. H. East	Oil Surfacing	1,487	1,504	2,991	572	3,563
124	158-217	III	Yolo	6	A	Davis	Yolo By-Pass	4.80	4-6--15	Palmer & McBryde	E. H. Hatch	18 ft. Concrete Base	53,371	33,039	86,410	5,832	92,242
D-58	156	III	"	6	A	Davis	Webster	4.29		Day Labor	W. H. Miller	Oil Surfacing	2,696	2,702	5,398	151	5,549
D-98	217	III	"	6	A	Station 104+14	Station 121+62	.41	3-10-16	Day Labor	F. C. Hewitt	18 ft. Concrete Base	2,534	2,319	4,853	122	4,975
D-105	156	III	"	6	A	At Station 348+50			5-17-16	Day Labor		Gravel Surface	20		20		20
D-147	217	III	"	6	A	S.P.R.R. Crossing at Davis		.23	7-9-17	Day Labor	B. C. Gerwick	Subway - 18 ft. Con.Base	14,986	5,858	20,843	1,704	22,547
D-148	156	III	"	6	A	Approach to Yolo Trestle		.90	8-3--17	Day Labor	C. Y. James	15 ft. Concrete Base	11,492	6,958	18,450	1,215	19,665
86	90	III	"	6	B	Across Yolo By-Pass		3.13	7-21-14	Graff Const. Co.	B. C. Gerwick	Concrete Bridge	254,930	149,510	404,440	18,638	423,078
150	90	III	"	6	B	Across Yolo By-Pass		.03	12-7--15	Security Const. Co.	C. H. Butts	Pascale Bridge	28,556	2,603	31,159	1,784	32,943
127	157-210	III	"	6	C	Yolo By-Pass	Sacramento River	3.69	4-16-15	Joe Lawrence	C. W. Marshall	18 ft. Concrete Base	32,388	17,790	49,178	3,739	52,917
D-102	157-210	III	"	6	C	Yolo By-Pass	Sacramento-Woodland R.R.	2.55		Day Labor	W. H. Miller	Oil Surfacing	1,122	1,125	2,247		2,247

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COMPLETED CONTRACTS, JUNE 30, 1920.

Con. No.	L.O. No.	Div.	County	Rte.	Sec.	From	To	Length (Miles)	Contract Date	Contractor	Res. Engineer	Type of Work	Final Estimate			Engr. During Const.	Total
													Work	Materials	Total		
D-149	157	III	Yolo	6	C	Approach to Yolo Trestle		1.13	8-3-17	Day Labor	C. Y. James	15 ft. Concrete Base	15,063	6,952	22,015	1,059	23,074
82	88-147	III	"	6-7	A	Southerly Boundary	Woodland	12.73	7-7-14	M. Blumenkrans	U. S. Marshall	15 ft. Concrete Base	54,562	50,336	104,898	5,273	110,161
D-67	89-147	III	"	6-7	A	Southerly Boundary	Woodland	12.91		Day Labor	W. H. Miller	Oil Surfacing	2,423	603	3,026	201	3,227
D-97	102	III	"	7	A	At Station 220+00			1-20-16	Day Labor		Pipe Culvert		20	20		20
191	283	III	"	7	C	Blacks	Hershey	10.95	7-12-17	C.H. & A.W. Gorrill	M. T. Heaton	15 ft. Concrete Base	167,468	70,965	238,433	8,956	247,389
D-196		III	"	7	C	Buckeye Creek Bridge Apprs.		.02		Day Labor		15 & 21 ft. Conc. Base	294		294	40	334
128	119	III	Yuba	3	A	Southerly Boundary	Morrison's Crossing	3.33	4-16-15	E. E. Roddan & Son	W. P. Ireland	15 ft. Concrete Base	22,417	11,590	34,007	3,203	37,210
D-201		III	"	3	A	Approaches to Dry Creek, Grasshopper & Best Slough Brgs.		.04	3-22-19	Day Labor	Carl F. Heintze	15 & 21 ft. Conc. Base	1,171	554	1,725	462	2,187
4	4-32	III	"	3	B	Morrison's Crossing	Marysville	9.21	7-23-12	F. E. Frey	H. C. Boyden	15 ft. Oil Macadam	67,430	270	67,700	4,944	72,644

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INCOMPLETE CONTRACTS, JUNE 30, 1920.

Con. No.	L.O No	Div.	County	Rte.	Sec.	From	To	Length (Miles)	Contract Date	Contractor	Res. Engineer	Type of Work	Expenditures to June 30 1920. Work	Materials	Total	Exp. during Const.	Total
D-140	284	IV	Alameda	5	A	Altamont	Greenville	.21	5-12-20	Day Labor		15 ft Concrete Base					
D-314	417	IV	"	5	B	San Ramon Creek Brg.Approx.		.11	3-11-20	Day Labor	H. E. Wessner	18 ft Concrete Base	54		54		54
D-196	317	III	Butte	3	B	Biggs	Nelson	12.70	7-31-18	Day Labor	T. H. Dennis	15 & 18 ft Conc Base	306 522	115.485	421.007	10.136	431.143
D-87	20-148	III	Butte	3	D	Chico	Northerly Boundary	12.56	12-4-15	Day Labor		Oil Surfacing	22		22	7	29
D-263	351	III	Calaveras	24	A	Westerly Boundary	Valley Springs	10.00	9-23-19	Day Labor		Gravel Surface	8,659	315	8,974		8,974
D-256	121	III	Colusa	7	B	Berlin	Colusa Junction	8.73	9-23-19	Day Labor	J.A. McDavitt	Oiling	2,646	4,162	6,808	74	6,882
D-255	172	III	"	7	C	Colusa Junction	County Line	10.73	9-23-19	Day Labor	J.A. McDavitt	Oiling	1,479	172	1,651	31	1,682
D-257	141	III	"	15	A	Williams	Colusa	6.74	9-23-19	Day Labor	J.A. McDavitt	Oiling	3,341	2,550	5,891	84	5,975
D-332	240	IV	ContraCosta	14	A	Intersection Route 14 & Pelton	Ave., El Cerrito		4-23-20	Day Labor		Conc.Base & Topk.Surf					
D-311	180	IV	"	14	B	Station 355+33	Station 361+58.98	.09	2-26-20	Day Labor		Grading & Conc. Base	4				
248	384	I	Del Norte	1	B	Last Chance Slide	Cushion Creek	7.73	7--8-19	Palmer & McBryde	F. W. Howard	Grading	105.513	9.461	114.974	14.666	129.640
265	397	I	"	1	B	Cushion Creek	Crescent City	4.08	12-15-19	Palmer & McBryde	F. W. Howard	Grading	8,562	948	9,510	607	10,117
D-262	131	III	Glenn	7	A	County Line	Willows	4.56	9-23-19	Day Labor	J.A. McDavitt	Oiling	3,232	103	3,335	100	3,435
D-266	177	III	"	7	B	Willows	Grapit	10.44	9-23-19	Day Labor	J.A. McDavitt	Oiling	7,735		7,735	8	7,743
D-269	302	I	Humboldt	1	B	At Dean Creek & Sta. 95+00			10-16-19	Day Labor		Bridges	3,963	1,740	5,703	26	5,728
D-276	346	I	"	1	G	Beatrice	Eureka	7.94	10-16-19	Day Labor	J. C. Lewis	15 ft. Concrete Base	22,263	16,900	39,163	2,695	41,858
220	343	I	"	1	H	Eureka	Arcata	6.17	5-1-18	Malvern-Fraser Co.	H. L. Thomas	Grading	60,703		91,631	9,069	100,700
249	366	I	"	1	J	Fresh Water Lagoon	Orick	2.80	7-28-19	J.Wilmshurst & J.F.Maddy	W. W. Perry	Grading	34,830	2,852	37,682	3,531	41,213
D-309	424	I	"	20	C	Redwood Creek	Three Creeks	12.77	2-26-20	Day Labor	J.J. Stockard	Grading	26,576	631	27,207	1,688	28,896
D-296	214	VII	Imperial	12	A	Meyers Canyon Grade		5.11	1-14-20	Day Labor	C. G. Kolster	Grading	11,644	2,814	14,458	109	14,567
D-304	413	VII	"	26	E	Gravel Wash	Northerly Boundary	8.33	2- 4-20	Day Labor	L. M. Ramson	15 ft. Concrete Base	52,254	21,328	73,582	225	73,807
D-288	409	VII	Imp-S.D.	12	H	Westerly Boundary	Station 51+77.54	.98	11-6-19	Day Labor	C. G. Kolster	15 ft. Concrete Base	21,376	9,669	31,045	226	31,271
266	408	VI	Inyo	23	A	Indian Allotment	Division Creek	7.50	2--4-20	Chas. D. Soteras	C. C. Boyer	Grading	11,935	1,488	13,423	1,114	14,537
D-249	126	VI	Kern	4	A	Southerly Boundary	2.3 So.of Rose Sta.	10.74	8-20-19	Day Labor	J.T Haviland	20 ft. Concrete Base	107,088	50,906	157,994	1,387	158,781
D-333	106	VI	Kern	4	B	Sta. 760+17	Sta. 832+97	1.00	4-22-20	Day Labor		15 ft. Concrete Base	2,922	1,121	4,043		4,043
D-336	106	VI	Kern	4	B	Grapevine Canyon	Sec.17,T.32,S.,R.28 E.	15.00	4-25-20	Day Labor		Oil Surfacing	2		2		2
253	388	I	Lake	16	A	Westerly Boundary	Lakeport	9.36	9--3-19	Erickson & Petterson, Inc.	F. A Kitts	Grading	77,999	7,903	85,902	6,079	91,981
226	333	II	Lassen	29	B	Conversale	Susanville	14.90	7- 2-18	J. P. Moffit	J. N. Bidwell	Grading	34,660	11,084	45,744	5,227	50,971
D-323	333	II	Lassen	29	B	Conversale	Susanville	15.00	4- 2-20	Day Labor	M J Tilley	Gravel Surface	1,936		1,936		1,936
257	38	VII	LosAngeles	2	C	Russell Ranch	Former Easterly Boundary	1.29	9-26-19	George R. Curtis	C. N. Ainley	18 ft. Concrete Base	25,205	8,529	34,734	896	35,630
258	290	VII	"	23	H	2 mi No. of Acton	Palmdale	8.64	9-26-19	Fred Hoffman	H. C. Foster	20 ft. Concrete Base	64,437	18,038	82,475	3,630	86,105
D-287	----	IV	Marin	8	A	At Petaluma Creek Bridge			11-16-19	Day Labor	R. W Sands	Operator's House & Lot	1,220		1,220		1,220
D-294	415	VI	Mariposa	18	H	El Portal	Yosemite National Park	1.28	1- 6-20	Day Labor	J.T Haviland	Grading	32,361	1,794	34,155	602	34,757
D-302	55	I	Mendocino	1	D	Forsythe Creek	Ridgewood-Vanairedale Rd.	7.79	2- 6-20	Day Labor	E. M. Cameron	Grading	3,266	56	3,322	202	3,524
D-303	27	I	"	1	E	Ridgewood-Vanairedale Rd.	Willits	6.85	2- 6-20	Day Labor	E. M. Cameron	Grading	9,747	1,466	11,213	479	11,692
D-208	385	I	"	1	G	Arnold	Sherwood-Laytonville Jct.	10.19		Day Labor	J.J. Stockard	Grading	206,309	24,659	230,968	6,660	240,068
D-195	362	I	"	1	H	Sherwood-Laytonville Jct.	Rattlesnake Summit	13.76	6- 7-18	Day Labor	J.J. Stockard	Grading	151,603	24,012	175,615	7,648	183,263
D-56	200-88-202	I	"	1	IJK	Rattlesnake Summit	Northerly Boundary	33.11	8- 1-15	Day Labor	J.J. Stockard	Grading	657,392	42,149	699,541	28,395	727,936
247	387	I	"	16	A	Hopland	Easterly Boundary	9.74	6-26-19	J. P. Holland	F. A. Kitts	Grading	113,247	20,170	133,417	7,991	141,408
D-301		I	"			At Willits			4- 2-20	Day Labor		Office Building	2,884	4,377	7,261		7,262
D-290		I	"			At Willits			11-13-19	Day Labor		Maintenance Yard	1,593	3,148	4,741	5	4,746
D-339	6	VI	Merced	4	D	Delhi	Stanislaus County Line	9.62		Day Labor		Concrete Shoulders					
265	349	VI	"	16	A	Merced	Easterly Boundary	14.89	6-26-19	J. E. Lee	H. K. Bain	18 ft. Concrete Base	52,251	53,255	105,506	5,313	110,819
D-236	332	II	Modoc	28	A	Adin Summit	Canby	10.85	5-28-19	Day Labor	S. W. Lowden	Grading	53,999	5,910	59,909	2,112	62,021
D-341	430	II	"	28	B	Canby	Alturas	17.11	5-24-20	Day Labor		Grading					
D-218		VI	Mono	23	C	Whiskey Creek Canyon	McGee Creek	7.61	3- 6-19	Day Labor		Grading	60.948	3,389	64,337	3,020	67,357
D-194	352	VI	"	23	G	Devils Punch Bowl	Tioga Road, Rte. 40	11.70	6-19-18	Day Labor	C. C. Boyer	Grading	35,704	3,414	39,118	1,877	40,995
D-162	52	V	Monterey	2	A	Station 210+00	Station 696+00	9.20	9-26-17	Day Labor	A. S. Moore	Oil Surfacing	7,646	1,983	9,629	51	9,680
D-163	174	V	"	2	B	Station 0+00	Station 848+00	10.28	9-26-17	Day Labor	A. S. Moore	Oil Surfacing	7,333	2,170	9,503	111	9,614
D-229	191	V	"	2	D	Exceptions 401+00 & 430+00		.54	4-10-19	Day Labor		15 ft. Concrete Base					
244	392	V	"	2	F	Across Salinas River		.50	6-18-19	Healy Tibbits Const Co.	E. B. Brown	Steel Bridge	215,567	40,608	256.165	3,845	260,010
D-175		III	Nevada	25	A	Nevada City	Northerly Boundary	18.00	12-28-17	Day Labor	R. W. Brown	Grading	97,063	25,281	122,344	379	122,723

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INCOMPLETE CONTRACTS, JUNE 30, 1920.

Con. No.	F. A. P. No.	Div.	County	Rte.	Sec.	From	To	Length (Miles)	Contract Date	Contractor	Res. Engineer	Type of Work	Expenditures to June 30, 1920. Work	Materials	Total	Engineering & Contingent	Total
252	388-389	VII	Riv-S.Bd.	26	A-B	County Highway No. 82	Beaumont	7.10	11--6-19	H. H. Lienau	R. P. Scott	Grading	36,389	6,644	43,033	2,643	45,676
257	412	VII	Riverside	26	G	Northeast cor. Section 6	Southerly Boundary	14.33	2--4-20	Chas. D. Soteras	L. H. Ransom	15 ft. Concrete Base	40,612	28,094	68,706	1,934	69,640
D-161	51	V	San Benito	2	A	Station 0+00	Station 248+00	4.45	9-25-17	Day Labor	A. S. Moore	Oil Surfacing	1,996	1,067	3,063	56	3,119
262	388-389	VII	S.Bd-Riv.	26	A-B	See Cont. 262, Riv. 26, A-B											
269	422-423	VII	San Diego	12	G-D	Flynn Springs	Ogden Ranch	11.27	5--7-20	Riley & Peterson	L. H. Ransom	15 ft. Concrete Base				168	168
263	400	VII	San Diego	12	F	Pine Valley	Cosbere Ranch	6.51	12-16-19	W. D. Goodbody	A. H. George	Grading	28,237	4,888	33,125	2,333	35,458
264	401	VII	San Diego	12	F	Cosbere Ranch	Tecate Divide	13.90	12-15-19	Wright & Doran	A. H. George	Grading	29,146	4,893	34,039	2,093	36,132
D-221	368	VII	San Diego	12	G	Tecate Divide	Easterly Boundary	15.21	4-10-19	Day Labor	C. C. Kelster	15 ft. Concrete Base	264,188	68,972	333,160	6,784	339,944
D-288	409	VII	S.D.-Imp.	12	H	See Cont. D-288, Imp. 12-H											
D-239	366	III	San Joaquin	4	A	Calla	Manteca	2.67	7-18-19	Day Labor	F. C. Hewitt	15 ft. Concrete Base	29,894	20,269	50,163	1,684	51,847
266	395	III	San Joaquin	4	D	Houston School	Northerly Boundary	4.72	9-26-19	W. A. Dontanville	R. A. Bergman	8 & 15 ft. Conc. Base	43,863	38,766	82,629	3,454	86,083
D-137	125	V	SanLuisObispo	2	B	Atascadero Creek	Paso Robles	.71	6-19-17	Day Labor	J. I. Boas	15 ft. Concrete Base	5,802	2,409	7,911	314	8,225
D-330	485-494	V	"	2	MEF	Excentions		1.42	4-15-20	Day Labor		15 ft. Concrete Base					
D-139	104	V	"	2	E	Arroyo Grande	SanLuisObispo(Exceptions)	.19	4-15-17	Day Labor		15 ft. Concrete Base	886	168	1,054		1,054
D-310		V	"			At San Luis Obispo			2-25-20	Day Labor		Maintenance Building	396	455	851	41	892
D-334	239	IV	San Mateo	2	B	Beresford	Redwood City	4.23	4-23-20	Day Labor		Conc.Shlds.& Topk.Surf.	272		272		272
D-322	376-377	V	Santa Barbara	2	ACE	Excentions		1.22	4-2--20	Day Labor		15 ft. Concrete Base	2,334	1,186	3,520	14	3,534
D-335	139	V	"	2	C	Through Los Alamos		.19	4-22-20	Day Labor		Concrete Shoulders					
D-323	376-377	V	"	2	D-E	Los Olivos	Zaca	15.00	4-2--20	Day Labor		Stockpiling materials	6,807		6,807	85	6,892
D-326	267	V	"	2	I	At Ortega Hill		.04	1-14-20	Day Labor		Guard Rail	134		134		134
D-324	267	V	"	2	J	Through Summerland		1.00	4-2--20	Day Labor	G.A.Tilton,Jr.	15 ft. Concrete Base	1,147	4	1,151	21	1,172
D-325	23	IV	Santa Clara	2	B	Ferry Station	Morgan Hill	4.00	4-2--20	Day Labor		Conc.Shlds.& Topk.Surf.	1,760	2,546	4,306		4,306
270	422-423	IV	S.Cr-S.Cl.	5	A-B	Glenwood	Los Gatos	13.56	5-12-20	J. L. Conner	E. Blockley	15 ft. Concrete Base					
D-281	419	II	Shasta	3	A	Cottonwood Creek Brg.Appro.			11-6-19	Day Labor		Grading	2,028	197	2,225		2,242
D-280	388-378	II	"	3	C-D	Station 754+78, Sec. C	Northerly Boundary	34.50	10-23-19	Day Labor		Gravel Surfacing	126,357	2,900	129,257		129,257
241	377-378	II	"	3	A-B	Tower House	Redding	15.34	9-19-19	F. Rolandi	A.F.McCarton	Grading	1,468	18,813	20,281	1,500	21,781
D-241	377-378	II	"	3	A-B	Tower House	Redding		10-15-19	Day Labor		Grading & Gravel Surf.	26,971	100	27,071		27,071
D-327	377-378	II	"	29	A	Shingle & Salt Creek Bridges	& Station 506		4-20-20	Day Labor		Grading Approaches	810		810	46	856
D-329		II	"			At Redding			1-10-20	Day Labor		Maintenance Buildings	4,000		4,000		4,000
D-116		III	Sierra	25	A	Westerly Boundary	Downieville	17.33	1-25-17	Day Labor	L. H. Taylor	Grading	131,932	14,115	146,047	4,129	150,176
D-241		III	"	25	A	Across North Fork Yuba River			9-25-19	Day Labor		Steel Bridge	7,145	6,365	13,504		13,504
D-232	362	II	Siskiyou	3	B	Weed	Gazelle	10.78	5-8--19	Day Labor	E.J. Bassett	Grading	81,190	7,019	88,209	5,292	93,501
D-271	79	III	Solano	7	A	Benicia	2½ miles So. of Cordelia	9.05	10-15-19	Day Labor		Oil Surfacing				1	1
D-270	127	III	Solano	7	D	Vacaville	Near Batavia	8.17	10-15-19	Day Labor		Oil Surfacing		233	233		233
D-272	273	III	Solano	7	E	Near Batavia	Northerly Boundary	8.35	10-15-19	Day Labor		Oil Surfacing					
D-287	388-388	IV	Son-Marin	8	A	See Cont. D-287, Mrn-8-A											
D-286	204	III	Stanislaus	13	A	Bald Eagle Ranch	Oakdale	5.00	11-6--19	Day Labor	C. Bovey	Concrete Shoulders	12,161	13,770	25,931	1,689	27,620
284	384-386	III	"	13	B	Oakdale	Easterly Boundary	12.79	9-3-19	Palmer & McBryde	A. Wallace	15 ft. Concrete Base	72,324	34,370	106,694	3,951	110,645
280	347	II	Tehama	3	A	Southerly Boundary	Los Molinos	11.72	11-6-19	Lynn S. Atkinson, Jr.	E.Q.Sullivan	15 ft. Concrete Base	47,483	38,670	86,153	3,193	89,346
D-282	347	II	"	3	A	At Tooles & Champlin Creeks			6-11-19	Day Labor		Grading Approaches	1,920		1,920		1,920
D-283		II	"	3	A	Appros. to Hedge, Elder, Jackson & Oat Creek Bridges		.25	6-11-19	Day Labor		14 ft. Conc.Base-Rst.Rail	1,454	1,439	2,893		2,893
D-285	420	II	"	3	C	End of L.O. 170	Northerly Boundary	1.14	7-23-20	Day Labor		Grading	2,374	527	2,901	80	2,981
281	427	II	"	3	D	Los Molinos	Red Bluff	14.52	6-24-20	Lynn S. Atkinson,Jr.	E.Q.Sullivan	15 ft. Concrete Base					
D-231	347	II	"	7	A	Apprs. to McClure & Truckee	Creek Bridges	.07	9-23-19	Day Labor		15 ft. Conc.Base-Rst.Rail	1,850	565	2,456	131	2,586
242	381	II	Trinity	20	E	Whites Bar Creek	Helena	11.40	5-28-19	F. Rolandi	C. D. Curry	Grading	146,795	9,428	156,223	10,899	166,122
D-95	71	VI	Tulare	4	E	Goshen	Traver	8.39	1-7--16	Day Labor		Oil Surfacing	10		10		10
D-319	178	VI	"	4	A	Westerly Boundary	S.P.R.R.	4.00	2-26-20	Day Labor		Oil Surfacing	727	278	1,005		1,005
D-243	178-179	VI	"	4	B	Visalia	3.3 mi. West of Visalia	3.23	10-15-19	Day Labor		Concrete Shoulders	11,045	11,001	22,046	21	22,067
D-253	67-266	III	Tuolumne	13	A-E	Westerly Boundary	Sonora		9-11-19	Day Labor	T. E. Read	Stockpiling Aggregate	36,192	454	36,646	1,121	37,777
251	36-197	VII	Ventura	2	A-B	Former Easterly Boundary	Cocoje Grade	5.20	11--6-19	George H. Curtis	C.N.Ainley	18 & 20 ft. Conc. Base	33,003	20,961	53,964	2,094	56,058
D-273	156	III	Yolo	6	A	Davis	Yolo Trestle,	2.06	10-15-19	Day Labor		Oil Surfacing					
D-274	156	III	"	6	C	Yolo Trestle	Sacramento	1.15	10-15-19	Day Labor		Oil Surfacing					
255	418	III	"	7	B	Woodland	Zamora	10.71	4-28-20	George S. Benson & Sons	F. H. Baker	16 & 18 ft. Conc. Base	7,671	718	8,389	634	9,023
D-154		III	Yuba	25	A	Southerly Boundary	Easterly Boundary	11.07	9-11-17	Day Labor	R. W. Brown	Grading	79,370	14,579	93,949	1,627	95,576

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APPENDIX R.

ANALYSIS OF MAINTENANCE EXPENDITURES.

By WALTER G. HUNTER and R. H. STALNAKER, Assistant Highway Engineers.

All costs for repairs of the state highways and of their maintenance are paid out of the so-called Motor Vehicle Fund.

The Vehicle Act passed in 1915 (chapter 188), amended by chapter 218 of the Statutes of 1917, and amended again in 1919 (chapter 147), superseded the older "Motor Vehicle Act," chapter 326 of the Statutes of 1913. Both the 1913 and the 1915 laws created a "Motor Vehicle Fund," but the distribution of the fund differs in the two acts.

Previous to the passage of the Motor Vehicle Act of 1913, chapter 612, Statutes of 1905 was in force, but it provided merely for the collection of nominal registration fees. No portion of the money collected was available for direct expenditure on the highways; the receipts went into the general fund of the state and none of the money was available to the California Highway Commission.

The Motor Vehicle Act of 1913 provided that the state's portion of the fund should be expended through the Advisory Board of the State Department of Engineering. It was the custom of that board to apportion a part of the fund to be expended by the State Engineer on roads taken over by the Legislature and on roads in state parks, and a part to the California Highway Commission for expenditure on roads taken over under the State Highway Act. This practice continued until July 27, 1917, when all roads formerly under the control of the State Engineer were turned over to the California Highway Commission.

The Motor Vehicle Fund now has paid into it all moneys received by the Motor Vehicle Department except the moneys received by it for transfers and for operators' and chauffeurs' licenses. The transfer and operators' license fund, plus so much of the other receipts of the department as are needed, up to a maximum limit of ten per cent of the receipts of the year, is available for expenditure by the Motor Vehicle Department for carrying out the provisions of the Vehicle Act. One half of the net balance remaining in the Motor Vehicle Fund is credited to the counties from which the money was received and the other half, "in addition to all sums that have heretofore and that may be appropriated hereafter by the Legislature for the same purpose," is available for expenditure under the direction of the California Highway Commission for the maintenance and improvement of the state roads and highways under the jurisdiction of the California Highway Commission and for the maintenance and improvement of roads and highways in state parks.

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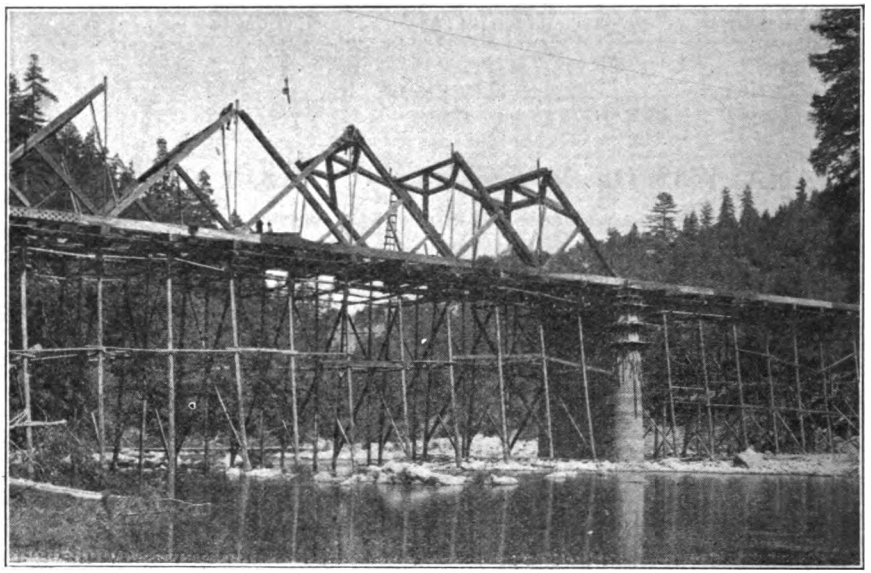


Plate LXI. Constructing Bridge on State Highway, Humboldt County, Over Eel River, near Garberville.

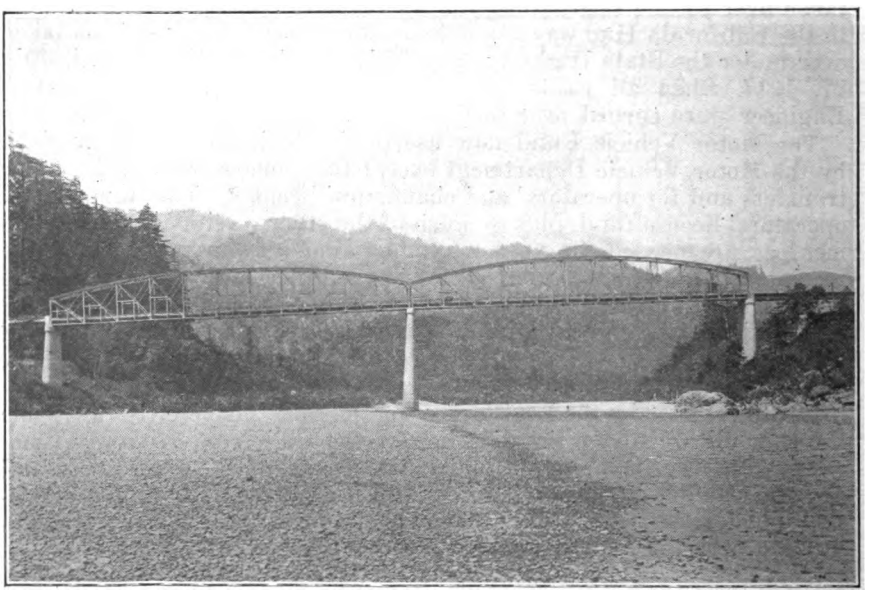


Plate LXII. Bridge on State Highway, Humboldt County, Over Eel River, near Scotia.

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The portion of the Motor Vehicle Fund set aside by the State Controller available for expenditure each year, under the direction of the California Highway Commission, follows:

1914 (a)	$ 591,228 57
1915 (a)	932,492 78
1916 (a)	964,784 65
1917 (a)	1,247,268 80
1918	1,421,319 79
1919	1,924,299 77
1920 (first six months only)	2,323,264 62
Total	$9,404,658,98
Expended under direction of State Engineer	541,831 15
Total available for use by California Highway Commission	$8,862,827 83

(a) Includes amounts allotted to State Engineer.

Expenditures.

Upon page 97 of this report is given a statement of total expenditures from the California Highway Commission portion of the Motor Vehicle Fund, from the creation of said fund to June 30, 1920. This statement lists the expenditures under thirteen accounts, the total amount expended to June 30, 1920, being $5,780,550.92.

It should be understood that the several State Highway Funds provide for the construction of certain specific roads named in the state highway acts, and that the Motor Vehicle Fund also provides for the improvement, in addition to the maintenance, of all roads under the jurisdiction of the California Highway Commission, no matter how such roads came under its jurisdiction. Consequently, there is some overlapping of classes of work done under the various funds, as for instance:

Oiling plants have been constructed under both funds; the land for maintenance yards has been purchased under both funds; construction equipment, engineering equipment, furniture and fixtures, stable equipment, automobile equipment, camp equipment, and shop equipment—all have been purchased under both funds. The equipment, etc., purchased out of State Highway Fund moneys eventually becomes available for maintenance, but the Motor Vehicle Fund is not charged therewith. Likewise, equipment purchased under the Motor Vehicle Fund is also available for use on work done under the State Highway Funds.

So the $5,780,550.92, stated above as the total expenditure to June 30, 1920, from the Motor Vehicle Fund, does not represent all the maintenance expenditures upon the state highways, but it does cover all ordinary maintenance expenditures, together with certain improvement costs.

Account 135, Stores, covers the purchase of materials for future use, and, when actually issued for use on a particular job the materials are then charged to the job.

Account 145, County Expense, includes the cost of surveys and plans made for the improvement of state roads, which are not included in any of the State Highway Acts.

All of the expenditures made under accounts 106, 108, 110, 120, 121, 122, 123, 124, 125 and 128, are of such nature that no distribution can be

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Plate LXIII. State Highway, Mendocino County, Convict Work.

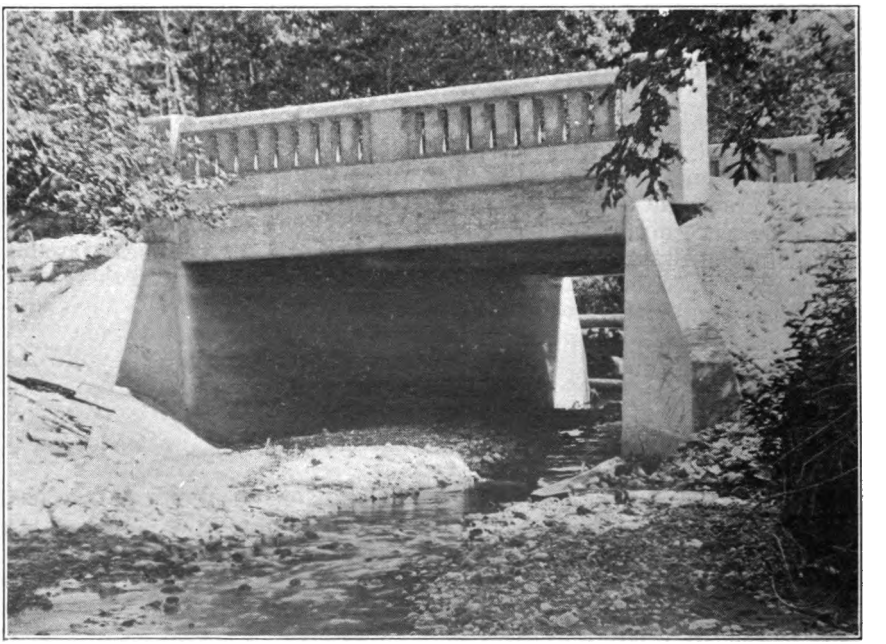


Plate LXIV. Bridge on State Highway, Shasta County, Over Charlie Creek.

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made easily to the various sections. Account 135 represents goods on hand which are further distributed as issued for use. Account 145 is segregated in the detailed accounts by county, route, and section and has no practical bearing on the maintenance of highways. For this reason no further analysis of these accounts is made herein. The total expenditures included in these twelve accounts amount to $562,041.23, or about 10 per cent of the total Motor Vehicle Fund expenditures. *

The Maintenance Tabulations.

Account 103, Highway Maintenance, includes all other expenditures, totaling $5,118,509.60, and the detailed figures are given on pages 159–163.

This account 103 covers all direct expenditures on the roads for general maintenance, improvement, and reconstruction, including supervision, administration, injuries to employees, repairs to equipment, and other items of a general nature, all of such items as supervision, repairs to equipment, etc., being distributed in proportion to the direct charges on each section.

The highways are listed by counties, the division, route and section being given, as well as a brief description of termini of the various sections, and the expenditures are segregated under three classifications, viz: "General Maintenance," "Improvement" and "Reconstruction." These three classifications are further broken up into three other subdivisions—"Pavement Base," "Pavement Surface" and "Miscellaneous"—all of which are defined as follows:

"General Maintenance" includes the expenditures to maintain the roads and make minor repairs so as to keep the roads in approximately the same condition as when constructed;

"Improvement" includes expenditures for new construction or betterment, such as changes in line, grade, or type of construction. (See page 155 for further details.)

"Reconstruction" includes expenditures for the rebuilding with original type over large areas. and the rebuilding of an entire unit of construction even though small. (See page 155 for further details.)

"Pavement Base" includes repairs to concrete, macadam, or other base courses of pavement on top of subgrade.

"Pavement Surface" includes repairs to oil, asphalt, gravel, or other surfaces, and also includes the maintenance of a smooth surface on earth roads. (Repairs to concrete base roads such as the oiling of cracks, etc., have in many cases been charged to "Pavement Surface" —an apparent inconsistency, but, due to the opening of concrete base roads to traffic before the wearing surface was applied, the concrete base became temporarily a pavement surface.)

"Miscellaneous" includes all the other expenditures which are listed on the detailed accounting books as:

"Shoulders" includes all work on earth, oil macadam, or other shoulders of a temporary or semipermanent nature. (Work on concrete shoulders, which are virtually a widening of the pavement, is not charged to this account but is charged to "Pavement Base" or "Pavement Surface", as the case may be.)

"Culverts and Drainage" includes all work on drainage ditches, culverts, drains, bridges, trestles, and other drainage structures.

*For the details of these several accounts, see page 97 of this report.

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"Guard Rail" includes all work on guard rails, parapet walls, stone markers, and other devices for guiding and safeguarding the traffic, including road signs.

"Road Sides" includes eradication of noxious weeds, trimming of slopes, elimination of burrowing animals, removal of minor slides and other work of like nature.

"Grading" includes original grading, grade and line changes and restoring the road after slides or washouts, which removed the roadbed.

"Trees" includes the planting, watering and care of trees.

Under the column headed "Type" appear the following symbols: E, CB, OC, OM, TonM, TonC, AonC, AC, TonP. These symbols indicate the character of the construction as of date, June 30, 1920, and the symbols have the following significance:

E=Earth, earth and gravel, or graveled road. Many of the earth roads constructed by the California Highway Commission have been surfaced in whole or in part with local gravel or crushed rock, but such roads are considered to be earth roads at present.

CB=Concrete base.

OC=Oiled concrete (concrete base with thin bituminous wearing surface).

OM=Oil macadam.

TonM=Topeka on macadam.

TonC=Topeka on concrete.

AonC=Sheet asphalt on concrete.

AC=Asphaltic concrete.

TonP=Topeka on planks (bridges and trestles).

The column headed "Miles under Maintenance" shows only the mileage of each section which is actually being maintained by the California Highway Commission, the figures being in many cases less than the distance between termini of the sections, due to exceptions not yet taken over, awaiting right-of-way to be secured by the counties for proposed line changes, awaiting the construction of bridges, overhead or underpass crossings, etc., and roads in incorporated cities.

The "Date Completed" column gives the date the roads were considered to be constructed and turned over to maintenance. The dates given are for the completion of contract and day labor work, but the beginning of maintenance on completed roads taken over from counties, roads taken over by act of Legislature, and roads turned over to the California Highway Commission by the State Engineering Department, is shown under "Remarks".

Some maintenance expenditures have been made on completed portions of roads under contract. The contracts provide for the taking over and maintaining by the state of completed sections not less than one mile in length and a similar policy has been adopted on day labor work, wherever it was necessary to care for traffic during the construction period. Moreover, on some of the mountain roads constructed by day labor, the roadbed is completed and thrown open for traffic and the minor details, such as culvert headwalls and guard rail, constructed at a later date. The expenses of keeping the road in condition for traffic during the interim are proper maintenance charges.

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Improvement.

The expenditures listed under "Improvement" cover, mostly, the surfacing of earth roads with local material; the surfacing of concrete base with thin bituminous carpet or Topeka asphaltic mixture; the construction of gravel, oil macadam, and concrete shoulders; the minor improvements such as guard rail, widening cuts, line and grade changes, etc.

Some new construction has been done under the Motor Vehicle Fund and the expenditures listed under "Improvement," as for instance:

Road III. Sac–3–B—An oiled concrete pavement from North Sacramento to Ben Ali.
Road III. Sta–4–A—Concrete shoulders and Topeka top.
Road I. Hum–1–G—4.32 miles of concrete base.

Other unusual work done and listed under "Improvement" follows:
Quincy Lateral—Preliminary work.
Road II. Mod–28–A–B—Preliminary work.
Road II. Las–29–B—Survey and partial construction by convict labor.
Road II. Sha–28–B—survey and partial construction by convict labor.
Road III. Sie–25–A—Survey and partial construction by convict labor.

The coast highway from near Ukiah to Eureka and the Valley highway from Redding to Dunsmuir and from Yreka to the Oregon line, have both been surfaced with local rock or gravel for nearly their entire length, the work being done under both the State Highway Fund and the Motor Vehicle Fund, and the portion done under the Motor Vehicle Fund is listed under "Improvement".

All improvements made on roads under the jurisdiction of the California Highway Commission and not named in the State Highway Acts, have necessarily been made under the Motor Vehicle Fund.

Reconstruction.

Under this heading the larger expenditures are for the reconstruction of oil macadam roads taken over from the counties, and for restoring and strengthening concrete bases which started to fail due to heavy traffic, changed drainage conditions, poor subgrade, etc. The concrete base reconstruction consists of repairing the original base and adding an additional slab of concrete on top, reinforced in some cases—this work being really an "Improvement" as well as "Reconstruction," although listed under the latter heading.

In a few cases bridges, constructed by the counties and afterwards taken over by the California Highway Commission, and which had insufficient waterway to carry extreme floods or were destroyed by floods, have been reconstructed under the Motor Vehicle Fund and the expenditures listed under "Reconstruction." The San Luis Rey bridge near Oceanside, in San Diego County, is the largest instance of this class of work.

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Plate LXV. State Highway, Stanislaus County, near Riverbank. Preparing Subgrade for Concrete Shoulders.



Plate LXVI. State Highway, Stanislaus County, near Turlock. Laying Asphalt Surface.

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General Maintenance: Average Cost Per Mile Per Year.

In addition to the data in the "Maintenance Tabulation," which shows the "General Maintenance," "Improvement," and "Reconstruction" expenditures made for the entire period from the beginning of maintenance to June 30, 1920, figures have been prepared to show the average cost per mile per year for "General Maintenance" for the various types of roads and pavements.

The acounting costs for maintenance have, until recently, been kept for each "section" as a unit, although some sections comprise several types of roads and pavements, consequently it is impossible to include all the mileage of any one type in preparing the average annual cost figures. However, all sections have been included where a clean cut segregation of expenditures for the various types of roads and pavements could be made, and it is believed the figures given represent a very close approximation to the average costs (at least for the major types) for the entire system.

The average cost figures are as follows:

Type	Miles included in study	Year miles	Cost per year mile			Total
			Pavement base	Pavement surface	Miscellaneous	
Concrete base, unsurfaced	418.02	1,385.21	$49 11	$23 08	$85 25	$157 44
Concrete base, oil surface	346.73	2,087.85	38 11	57 71	106 41	202 23
Concrete base (partially oiled sections)	110.52	572.43	41 21	80 36	92 55	214 12
Concrete base, bare and oiled (average of above three classes)	875.27	3,975.49	42 33	49 08	97 15	188 56
Topeka on macadam	5.06	29 10	56 10	92 05	87 23	235 58
Topeka on concrete	6.41	36 61	0 41	35 54	148 47	184 42
Oil macadam	180.80	835.49	127 82	161 19	116 58	405 59
*Earth	1,251.63	3,800.41	5 71	60 29	162 14	228 14

*The low average cost for "earth" roads is due to the inclusion of many mountain roads upon which but little maintenance work has been done. The average cost for "general maintenance" on the heavier traveled roads is considerably more, for instance: (1) The road from Placerville to Lake Tahoe cost $389.76 per year mile for the last three years. (2) The road from the Mendocino-Humboldt County line to Fortuna, 66 miles in all, with 272 year miles, cost $512.65 per year mile. (In addition to this $512 65 for general maintenance, the "improvement" cost per mile year was about $500, mostly for gravel surfacing.)

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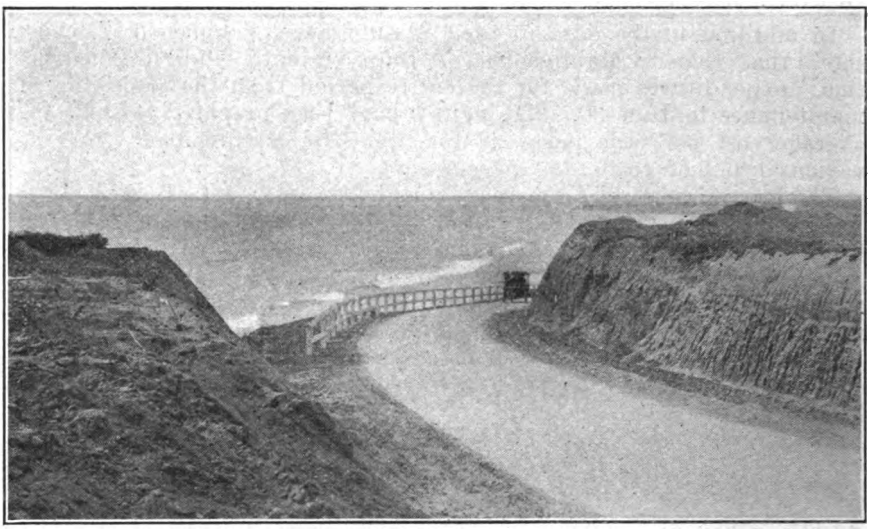


Plate LXVII. State Highway, San Diego County, near Oceanside.

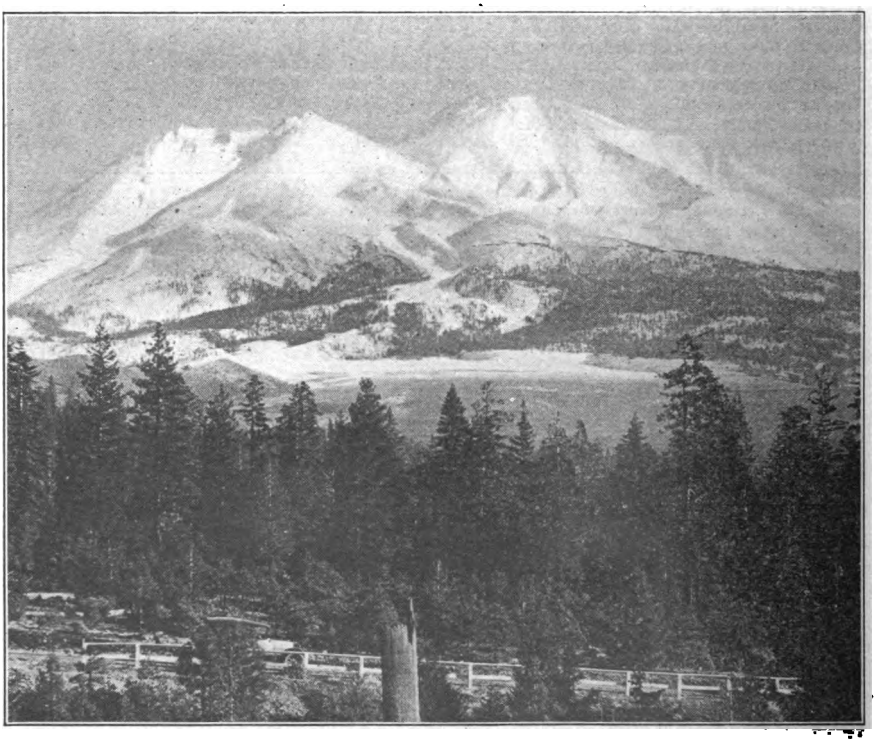


Plate LXVIII. On Route of State Highway, Siskiyou County, Mount Shasta in Distance.

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MOTOR VEHICLE FUND EXPENDITURES.

Div	County	Rte	Sec.	From	To	Type	Miles under Maint.	Date Completed	Total	General Maintenance				Improvement				Reconstruction				Remarks
										Pavement Base	Pavement Surface	Miscellaneous	Total	Pavement Base	Pavement Surface	Miscellaneous	Total	Pavement Base	Pavement Surface	Miscellaneous	Total	
IV	Alameda	5	A	Easterly Boundary	Livermore	CS	3.39	9-26-18	52,641.98	3,765.83	10,667.44	17,363.84	31,797.11			18,444.39	18,444.39	1,673.29	303.90	423.29	2,400.48	
	"	5	B	Livermore	Hayward	CS CS AsC	10.34 9.09 2.67	10-15-15	89,088.93	23,789.80	21,128.36	8,039.55	52,942.71			1,852.36	1,852.36	1,884.38	1,287.62	1,851.84	4,643.84	2.26 CS completed 8-24-16. 2.26 CS completed 1-15-16. Bal. constructed locally.
	"	5	C	Hayward	Southerly Boundary	CS CS	9.46 8.70	10-11-16 4-24-19	15,021.50	2,240.30	5,892.11	5,945.09	13,977.50			986.82	986.82		297.18		297.18	
	"	5	D	Oakland	Hayward	CS TosC	8.70 0.34		8,236.33	1,532.88	2,676.88	2,538.30	6,849.56					926.80	467.87		1,386.67	Topsoln Surface laid on old County Pavement.
III	Alpine	23	A	South Easterly Boundary	Silver King Valley	TosM	4.72	12-22-14	441.66				441.66									Taken over from State Hgy. Dept.7-27-17.
	"	23	B	Silver King Valley	Monte 24		8.00 10.00		770.06		71.86		770.06									" " " " " " "
	"	23	C	Monte 24	Markleeville		9.97		3,887.97		283.49	3,604.48	3,887.97									" " " " " " "
	"	23	D	Markleeville	Woodfords		6.80		2,539.73			2,539.73	2,539.73									" " " " " " "
	"	23	E	Woodfords	Plumtis (Rte.34)		6.46		2,192.13	67.83		2,087.30	2,155.13									" " " " " " "
	"	23	F	Plumtis (Rte.34)	Luthers Pass		2.50		768.86		41.45	727.41	768.86									" " " " " " "
	"	24	A	Easterly Boundary (Bleeds)	Carson Pass		10.80		1,748.29		658.00	1,090.29	1,748.29									" " " " " " "
	"	24	B	Carson Pass	Silvia's Pass		8.00		1,050.11		86.59	1,063.91	1,050.11									" " " " " " "
	"	24	C	Silvia's Pass	Silver Crest (Rte.23		10.10		2,062.46		71.68	1,990.81	2,062.46									" " " " " " "
	"	24	A	Easterly Boundary-Kirkwoods	Carson Pass		8.60		816.40		4.02	812.38	816.40									" " " " " " "
	"	24	B	Carson Pass	Plumtis (Rte.23)		9.40		1,353.53		57.84	1,295.69	1,353.53									" " " " " " "
III	Amador	26	B	Jone	Pine Grove		10.74 8.40		305.05 3,296.74			305.05 3,296.74	305.05 3,296.74									" " " " " " "
	"	26	C	Jackson	Pine Grove		10.20		24,575.90	3,630.64	990.46	7,935.66	12,556.76	11,127.24	247.54	234.37	11,609.15					" " " " " " "
	"	26	D	Pine Grove	Chaparral		10.00		1,863.13		96.90	1,766.23	1,863.13									" " " " " " "
	"	26	E	Chaparral	Cook Station		3.00		1,863.13			1,863.13	1,863.13									" " " " " " "
	"	26	F	Cook Station	0.61 Mi. East of Hen's		10.00		1,863.13			1,863.13	1,863.13									" " " " " " "
	"	26	G	0.61 Mi. East of Hen's	Tragedy Springs		12.00		3,960.23			3,960.23	3,960.23									" " " " " " "
	"	26	H	Tragedy Springs	Easterly Boundary		12.00		2,363.10			2,363.10	2,363.10									" " " " " " "
III	Butte	3	A	Southerly Boundary	Oroville	CS	7.20	8-13-19	17,209.95	517.17	842.15	3,102.16	4,461.48		7,310.42	5,436.56	12,746.97					Incomplete.
	"	3	B	Oroville	Chico	CS	13.36		12,747.90	1,521.93	1,204.17	6,020.30	8,746.40									
	"	3	C	Chico	Orland	CS	13.36	9-26-16	13,044.10	2,308.56	655.04	10,301.34	13,044.10									
	"	3	D	Orland	Northerly Boundary	CS	12.80	11-15-19	7,220.73	1,370.81	639.43	5,210.30	7,220.73									
	"	21	A	Oroville	Oroville Road		6.38															
III	Calaveras	22	A	Southerly Boundary	Angels		9.20		442.28			442.28	442.28									Established by Statute 7-27-19.
	"	22	B	Easterly Boundary	Valley Springs		10.00	8-13-19	4,485.41	44.81	38.41	402.19	485.41									
	"	22	C	Valley Springs	San Andreas		10.00	4-26-18	17,666.45		456.38	13,865.29	14,321.67		72.76	3,271.74	3,344.50					Taken over from State Hgy. Dept. 7-27-17.
	"	22	D	San Andreas	Black Creek		10.80		2,474.95			2,474.95	2,474.95									
	"	22	C	Black Springs	Easterly Boundary		12.30		2,474.95			2,474.95	2,474.95									
III	Colusa	7	A	Southerly Boundary	Berlin	CS	7.29	10-30-16	4,800.77	886.98	1,300.02	2,420.30	4,609.30		243.79	7.68	251.47					
	"	7	B	Berlin	Colusa Junction	CS	7.44	6-24-16	19,118.00	3,758.73	3,006.41	4,589.17	11,334.31	902.32	6,888.37		7,790.69					
	"	7	C	Colusa Junction	Northerly Boundary	CS	10.30	8-24-16	4,306.85	1,680.70	979.40	1,677.37	4,146.47	98.38	61.96		160.34					Oiling in progress.
	"	15	A	Williams	Colusa	CS	11.86	11-22-16	7,401.36	1,701.58	1,295.68	3,404.10	6,401.36	142.76	4,070.86	188.73	4,400.33					
IV	ContraCosta	14	A	Southerly Boundary	Pinole	TosC	2.18 2.18	12-1-17	13,778.71	4,953.88	1,602.64	3,128.23	9,684.75		1,095.68	3,001.28	4,096.96					Grading completed 7-20-15.
III	El Dorado	16	B	Nevada	Martinez	CS	20.58	6-24-16	29,272.71	2,940.04	727.31	17,466.16	21,133.50									
	"	11	A	Easterly Boundary	Shingle Springs	CS	17.00	7-24-16	17,000.00	1,218.97	2,021.01	14,760.02	18,000.00									
	"	11	B	Shingle Springs	El Dorado	CS	5.23	7-24-16	3,772.60	436.37	1,000.49	2,334.24	3,771.10									
	"	11	C	El Dorado	Placerville	CS	2.67	6-24-16	1,918.32	157.32	778.77	982.23	1,918.32									
	"	11	D	Placerville	0.4 Mi. E.Smith Flat		1.60		1,979.02		21.80	1,944.06	1,979.02									Taken over from State Hgy. Dept.7-27-17.
	"	11	E	0.4 Mi. E.Smith Flat	Bowman's Hall		6.30		7,744.19	57.42	1,240.52	6,446.25	7,744.19									" " " " " " "
	"	11	F	Bowman's Hall	Riverton		11.00		8,314.49	53.82	1,286.75	6,973.92	8,314.49									" " " " " " "
	"	11	G	Riverton	Kyburz		9.80		4,513.34	44.45	348.88	4,119.99	4,513.34									" " " " " " "
	"	11	H	Kyburz	Strawberry		10.00		2,106.84	44.45	348.88	1,713.51	2,106.84									" " " " " " "
	"	11	I	Strawberry	Osgoods Alpine Jct.		9.90	10-30-20	21,241.93	1,351.99	9,049.60	10,809.93	21,211.52									" " " " " " "
	"	11	J	Osgood's Alpine Jct.	Rte.23 near Myers				4,811.49	1,140.97	1,766.77	903.28	3,811.02									" " " " " " "
	"	11	K	Rte.23 near Myers	Easterly State Line		8.45		1,104.39	39.03	42.38	1,023.32	1,104.39									" " " " " " "
	"	23	A	Luthers Pass	Osgoods Alpine Jct.		15.00		3,448.26		108.00	3,340.26	3,448.26									" " " " " " "
	"	24	A	Rte.11 near Myers	1 Mi. East of Tallac		9.08		3,333.21		40.77	3,292.44	3,333.21									" " " " " " "
	"	26	A	1 Mi. East of Tallac	Rubicon Point		8.00		3,282.78		40.00	3,242.78	3,282.78									" " " " " " "
	"	26	B	Rubicon Point	Kennedy/McKinneys		8.00		3,282.78		40.00	3,242.78	3,282.78									" " " " " " "
VI	Fresno	4	A	Southerly Boundary	Fowler	CC	6.21	1-12-16	23,592.57	3,893.66	7,943.68	9,886.88	21,724.22			3,319.20	3,319.20					
	"	4	B	Fowler	Fresno	CC	6.21	4-24-16	46,041.34	882.18	13,351.34	9,815.46	24,048.98		27,453.36	16,198.44	43,651.80					Concrete Base completed 11-24-14.
	"	4	C	Fresno	Northerly Boundary	CC CS	5.78 10.00	4-24-16 4-24-16	10,618.65	1,033.32	1,226.88	3,196.88	5,456.30	50.02	450.60	4,663.73	5,164.35					.14 Mi. resurfaced with Topsoln 1920.
	"	10	A	Coalinga	Del Flaco	CS	8.06	4-24-16	8,077.85	229.48	48.57	3,794.80	4,072.85									
	"	44	A	Gen. Grant Park	Dome		10.50		6,078.53		171.37	3,871.24	4,042.61						2,031.55	2,031.55		Taken over from State Hgy. Dept.7-27-17.
	"	41	B	Dome	Kings River Canyon		8.00		1,448.26	1.03		1,448.26	1,449.29									
III	Glenn	7	A	Southerly Boundary	Willows	CS	5.82	8-24-16	19,304.86	5,822.56	3,675.15	6,256.82	15,754.53	171.24	3,479.09		3,650.33					Oiling in progress.
	"	7	B	Willows	Orapit	CS	2.97 10.50	4-18-16	2,078.65	6,588.17	1,004.11	7,499.41	5,582.17									Oiling completed 12-4-15.
	"	7	C	Orapit	Northerly Boundary	CC	7.00	1-12-16	7,000.87	788.87	422.00	4,189.00	5,399.87		134.63		134.63					Established by Statute 7-27-19.
	"	42	A	Willows	Glenn		11.40		2,403.86		54.70	2,348.15	2,402.85									Established by Statute 7-27-19.
	"	45	B	Glenn	Sacramento River		11.00		2,742.61	1.28		2,742.12	2,743.40			36.21	36.21					
I	Humboldt	1	A	Southerly Boundary	Garberville	CS	11.17	11-24-14	34,166.13		1,456.57	14,156.04	15,612.61		3,038.62	16,940.40	19,979.02					Graveled 1-15-20.
	"	1	B	Garberville	Miranda	CS	15.51	9-23-19	14,805.47	70.21	1,298.88	9,661.85	11,030.94		3,774.53		3,774.53					
	"	1	C	Miranda	Myrtle	CS	13.92	9-15-13	42,082.42		2,310.56	27,661.85	29,972.41	17	9,115.93		9,115.93					
	"	1	D	Myrtle	Jordan Creek	CS	11.25	6-24-16	14,736.03		1,376.03	9,313.94	10,689.97	28	3,986.04	14	4,028.04					
	"	1	E	Jordan Creek	Rio Dell	CS	7.25	6-24-16	9,373.92		1,373.92	6,773.92	8,147.84	20	1,209.14	12	1,241.14		580.24	580.24		
	"	1	F	Rio Dell	Fortuna	CS	7.42	6-24-16	7,909.01		1,373.92	6,773.92	8,147.84	20	1,209.14	12	1,241.14					
	"	1	G	Fortuna	Eureka	CS	4.32	1-23-17	55,867.39	6,060.45	864.63	5,538.51	12,463.59	37,323.41	968.59	5,114.80	43,403.80					Grading completed 8-8-15. .

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MOTOR VEHICLE FUND EXPENDITURES.

Dist.	County	Rte.	Sec.	From	To	Type	Miles Added	Date Completed	Total	General Maintenance: Pavement Base	General Maintenance: Pavement Surface	General Maintenance: Bituminous	Total	Improvement: Pavement Base	Improvement: Pavement Surface	Improvement: Bituminous	Total	Reconstruction: Pavement Base	Reconstruction: Pavement Surface	Reconstruction: Bituminous	Total	Remarks
VII	Imperial	6	A	Kentucky Boundary	Curtis Wells		6.0	6-15-16	6,000.00		875.70	1,124.30	2,000.00					238.42			238.42	
				Curtis Wells	Ogilvie Canal		11.4	6-15-16	11,400.00		3,000.00	3,000.00	6,000.00		72,154.07		72,154.07	670.00			670.00	
				Ogilvie Canal	Ave Main		1.0	6-15-16	1,000.00		500.00	500.00	1,000.00		4,772.80		4,772.80					
				Ave Main	Ave Main		1.0	6-30-17	1,000.00		500.00	500.00	1,000.00		4,772.80		4,772.80					
				Ave Main	El Centro		16.3	6-30-17	16,300.00		2,000.00	2,000.00	4,000.00		13,413.00		13,413.00					
				El Centro	Ave Main		16.3	6-30-17	16,300.00		2,000.00	2,000.00	4,000.00		46,304.99		46,304.99					
VII	Kern	4	A	Kentucky Boundary	Mojave		15.1	6-15-16	15,100.00		7,100.00	7,100.00	14,200.00									
				Mojave	Rosamond		10.0	6-15-16	10,000.00		5,000.00	5,000.00	10,000.00									
				Rosamond	Rosamond Road		5.0	6-15-16	5,000.00		2,500.00	2,500.00	5,000.00									
				Rosamond Road	Kern-Los Angeles Co. Line		10.0	6-15-16	10,000.00		5,000.00	5,000.00	10,000.00									
				Kern-Los Angeles Co. Line	Lancaster		15.0	6-15-16	15,000.00		7,500.00	7,500.00	15,000.00									
				Lancaster	Palmdale		10.0	6-15-16	10,000.00		5,000.00	5,000.00	10,000.00									
				Palmdale	Los Angeles Co. Line		12.0	6-15-16	12,000.00		6,000.00	6,000.00	12,000.00									
	Kings	4	A	Kentucky Boundary	Hanford		9.0	6-15-16	9,000.00		4,500.00	4,500.00	9,000.00	430.94	2,000.00	2,430.94		17,923.87	1,092.14	990.00	2,082.14	Oiling in Progress.
				Hanford	Kansas Ave		3.0	6-15-16	3,000.00		1,500.00	1,500.00	3,000.00					2,000.00				Under construction.
				Kansas Ave	Kansas Ave		1.0	6-30-17	1,000.00		500.00	500.00	1,000.00									Surfacing completed 8-4-16.
	Los Angeles	4	A	Kentucky Boundary	Rancho El Monte		9.0	6-30-17	9,000.00		4,500.00	3,211.00	7,711.00		27,145.53		27,145.53					
				Rancho El Monte	Los Angeles		1.0	6-30-17	1,000.00		500.00	500.00	1,000.00		2,000.00		2,000.00					
VII															29,145.53		29,145.53					
		2	A	Rancho El Monte	Colegrove		2.0	10-31-16	2,000.00		1,000.00	1,000.00	2,000.00	800.47	200.00	1,000.47		1,723.45	138.68		138.68	
				Colegrove	Kentucky Boundary		2.0	10-31-16	2,000.00		1,000.00	1,000.00	2,000.00	2,000.00		2,000.00		1,500.00				
				Kentucky Boundary	Los Angeles City Limits		4.2	10-31-16	4,200.00		2,100.00	2,100.00	4,200.00	3,000.00	190.99	3,190.99		6,223.45	62.30		62.30	1.20 M., Second Story C.M.P. Progress.
				Los Angeles City Limits	Central School House		15.0	10-31-16	15,000.00		7,500.00	7,500.00	15,000.00					6,000.00				Taken over from County 3-30-17.
		4	A	Central School House	Sec.17(Top of Ridge)		10.0	10-31-16	10,000.00		5,000.00	4,000.00	9,000.00	31,476.56	2,982.70	34,459.26		43,644.69				
				Sec.17(Top of Ridge)	Tejon-Castaic Road		2.0	10-31-16	2,000.00		1,000.00	1,000.00	2,000.00	1,000.00	1,000.00	2,000.00		2,000.00				Hilltop Surface under construction.
		4	A	Tejon-Castaic Road	Kern-Los Angeles Co. Line		11.0	11-30-16	11,000.00		5,500.00	5,500.00	11,000.00	35,476.56	3,982.70	39,459.26		45,644.69		94.37	94.37	
				Kern-Los Angeles Co. Line	Liebre Mountain		14.0	11-30-16	14,000.00		7,000.00	7,000.00	14,000.00	35,476.56	3,982.70	39,459.26		45,644.69		94.37	94.37	Oiling completed 12-24-17.
				Liebre Mountain	Los Angeles		14.0	11-30-16	14,000.00		7,000.00	7,000.00	14,000.00	3,983.00	1,000.00	4,983.00		9,341.46				Taken over from County 3-30-16.
				Los Angeles	Glendale		5.0	12-31-16	5,000.00		2,500.00	2,500.00	5,000.00		102.97	102.97		115.65				
				Glendale	Kentucky Boundary		5.0	12-31-16	5,000.00		2,500.00	2,500.00	5,000.00									
				Kentucky Boundary	Alhambra		4.0	12-31-16	4,000.00		2,000.00	2,000.00	4,000.00									
				Alhambra	Garvanza		2.0	12-31-16	2,000.00		1,000.00	1,000.00	2,000.00									
				Garvanza	Los Angeles		4.0	12-31-16	4,000.00		2,000.00	2,000.00	4,000.00									
				Los Angeles	Santa Monica Boulevard		4.0	12-31-16	4,000.00		2,000.00	2,000.00	4,000.00									
				Santa Monica Boulevard	Santa Monica City Limits		2.0	12-31-16	2,000.00		1,000.00	1,000.00	2,000.00									
				Santa Monica City Limits	Ocean Park		2.0	12-31-16	2,000.00		1,000.00	1,000.00	2,000.00									
				Ocean Park	Ocean Park Bridge		1.0	12-31-16	1,000.00		500.00	500.00	1,000.00									
				Ocean Park Bridge	Santa Monica		1.0	12-31-16	1,000.00		500.00	500.00	1,000.00									
				Santa Monica	Los Angeles		4.0	12-31-16	4,000.00		2,000.00	2,000.00	4,000.00									
				Los Angeles	Los Angeles		2.0	12-31-16	2,000.00		1,000.00	1,000.00	2,000.00									
				Los Angeles	Los Angeles		4.0	12-31-16	4,000.00		2,000.00	2,000.00	4,000.00									
				Los Angeles	Los Angeles		1.0	12-31-16	1,000.00		500.00	500.00	1

MOTOR VEHICLE FUND EXPENDITURES.

Div.	County	Rte.	Sec.	From	To	Type	Miles under Maint.	Date Completed	Total	General Maintenance: Pavement Base	General Maintenance: Pavement Surface	General Maintenance: Miscellaneous	General Maintenance: Total	Improvement: Pavement Base	Improvement: Pavement Surface	Improvement: Miscellaneous	Improvement: Total	Reconstruction: Pavement Base	Reconstruction: Pavement Surface	Reconstruction: Miscellaneous	Reconstruction: Total	Remarks
V	Monterey	2	A	S.Easterly Boundary	Salinas	OC	3.10	11-9-15	13 740.01	2,953.53	3,884.18	5,450.89	12,288.20	51.61	104.80	1,296.20	1,461.71					
	"	2	B	Salinas	.34 Mi. south Chualar	OC	9.33	3-23-16	17,888.57	1,801.61	1,149.80	2,150.17	5,101.78		214.90	12,511.89	12,986.79					Taken over from County 8-27-13. Oiling in progress.
	"	2	C	.34 Mi. South Chualar	Camphora	CB	10.96	6-19-18	2,784.56	1,641.23	433.38	709.94	2,784.55									
	"	2	D	Camphora	Greenfield	CB	11.80	12-19-16	6,126.70	1,461.88	482.13	1,648.78	3,642.79	2,138.86	351.11		2,483.97					
	"	2	E	Greenfield	King City	CB	10.50	6-7-16	4,132.70	1,742.11	469.10	1,921.49	4,132.70									
	"	2	F	King City	San Lucas	CB	8.06	12-10-18	1,410.26	608.63	133.39	668.24	1,410.26									
	"	2	G	San Lucas	San Ardo	CB	11.08	3-26-20	1,584.10	886.47	79.18	639.46	1,584.10									
	"	2	H	San Ardo	3 Mi. N. of Bradley	CB	10.86	9-26-16	11,512.32	1,634.10	64.46	9,803.77	11,512.32									
	"	2	I	3 Mi. N. of Bradley	Southerly Boundary	CB	10.43	8-13-19	2,492.08	1,204.46	189.21	997.29	2,390.96	98.04	14.08		107.12					
IV	Napa	8	A	Westerly Boundary	Napa	OC	4.25	11- -15	23,902.45	8,718.62	8,881.83	5,397.66	[illegible]		[illegible]	991.98	[illegible]					
	"	8	B	Napa	Easterly Boundary	CB	8.63	3-26-19	13,641.62	1,399.94	6,914.86	3,326.82	13,641.62									
III	Nevada	17	A	Southerly Boundary	Rattlesnake Creek		9.10	12-6-19	7,998.89	709.17	124.41	7,164.91	7,998.89									
	"	17	B	Rattlesnake Creek	Nevada City		5.70		2,006.97	430.85		1,566.12	2,006.97									
II III	"	25	A	Nevada City	Northerly Boundary		17.97	12-15-19	1,834.98		945.24	[illegible]	[illegible]		74.61	38.40	113.01					Under construction.
	"	37	A	Southerly Boundary	1 Mi. W. of Cisco		4.70		1,890.80	108.06		[illegible]	[illegible]									Taken over from State Hwy. Dept. 7-27-17.
	"	37	B	S.Boundary 3Mi.E.Cisco	S. Boundary SummitValley		8.00		3,213.56		430.87	[illegible]	[illegible]									" " " " " "
	"	37	C	S.Boundary at Summit	Westerly end Donner Lake		3.50		2,326.88			[illegible]	[illegible]									" " " " " "
	"	37	D	Westerly end Donner Lake	Truckee		5.50		1,946.59		16.02	[illegible]	[illegible]									" " " " " "
	"	37	E	Truckee	Sierra County Line		10.00		1,455.68		31.21	1,424.44	1,455.68									Established by Statute 7-29-19.
	"	38	A	Southerly Boundary	Route 37 Truckee		.80		372.99			[illegible]	372.99									Taken over from State Hwy. Dept. 7-27-17.
VII	Orange	2	A	S.Easterly Boundary	Galivan	OC	15.11	3-25-15	49,693.27	2,224.91	5,104.67	[illegible]	[illegible]	6,108.47	1,779.46	[illegible]	[illegible]			3,981.11	3,981.11	Surfacing completed 3-26-20.
	"	2	B	Galivan	Irvine	OC	5.68	11-9-15	15,530.27	165.28	2,224.83	5,815.10	8,205.21	[illegible]	[illegible]	[illegible]	[illegible]					
	"	2	C	Irvine	Santa Ana	OC	7.40	8-10-15	34,630.04	1,621.11	4,808.92	9,289.93	15,724.96	[illegible]	[illegible]	[illegible]	[illegible]					
	"	2	D	Santa Ana	Anaheim	TenC	4.90	10-13-14	20,961.58		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]					
	"	2	E	Anaheim	Fullerton	TenC	1.51	11-2-14	5,637.33	14.81	[illegible]	[illegible]	[illegible]			[illegible]	[illegible]					
	"	2	F	Fullerton	Northerly Boundary	OC	4.73	3-20-15	6,050.36	158.82	[illegible]	[illegible]	[illegible]									
III	Placer	3	A	Southerly Boundary	Lincoln	OC	10.02	6-23-14	11,948.41	3,665.20	[illegible]	[illegible]	[illegible]						956.16		956.16	
	"	3	B	Lincoln	Northerly Boundary	CB	9.42	12-19-16	3,109.18	932.93	439.16	[illegible]	[illegible]									
	"	17	A	Roseville	Penryn	CB	8.97	6-6-17	3,136.06	321.98	453.64	2,360.44	3,136.06									
	"	17	B	Penryn	Auburn		6.48	5-6-17	5,940.63	462.20	222.08	[illegible]	[illegible]									
	"	17	C	Auburn	Northerly Boundary		6.70		742.20	96.80	75.06	[illegible]	742.20									
	"	37	A	Auburn	Applegate		4.00		15,058.28	340.59	5,298.42	[illegible]	15,058.28									Old road. Under maintenance. Taken over from State Hwy. Dept. 7-27-17.
	"	37	B	Applegate	Colfax		8.10		5,616.80	9.76	28.67	5,577.47	5,616.80									" " " " " "
	"	37	C	Colfax	Gold Run		10.80		7,804.41	12.99	33.45	7,757.97	7,804.41									" " " " " "
	"	37	D	Gold Run	RR Crossing E of Towle		9.60		5,611.23	11.56	79.12	[illegible]	5,611.23									" " " " " "
	"	37	E	RR Crossing E of Towle	Emigrant Gap		6.80		7,084.42	6.18	2,161.91	[illegible]	7,084.42									" " " " " "
	"	37	F	Emigrant Gap	Northerly Boundary		3.50		3,056.76	4.21	1,100.14	[illegible]	3,056.76									" " " " " "
	"	37	G	1 Mi. W. Cisco	3 Mi. E Cisco		3.50		2,713.22	4.29		[illegible]	2,713.22									" " " " " "
	"	37	H	S.Boundary SummitValley	S.Boundary at Summit		3.00		2,321.44	3.61	448.10	[illegible]	2,321.44									" " " " " "
	"	38	A	S.Boundary (McKinneys)	Tahoe City		8.80		4,636.33			[illegible]	4,636.33									" " " " " "
	"	38	B	Tahoe City	Bridge over TruckeeRiver		5.50		3,226.94		344.06	[illegible]	3,226.94									" " " " " "
	"	38	C	Bridge over TruckeeRiver	Northerly Boundary		8.70		3,320.57		174.68	[illegible]	3,320.57									" " " " " "
	"	39	A	Tahoe City Rte.38	CrystalBay StateBoundary		11.60		[illegible]	42.77	[illegible]	[illegible]	[illegible]									" " " " " "
VII	Riverside	19	A	Westerly Boundary	Riverside	OC	9.34	12-22-14	11,224.68	579.80	4,579.91	[illegible]	11,224.68			1,365.03	1,365.03					
	"	26	B	Edom	Indio		.71	6- -19	10.04	10.04			10.04									
	"	26	C	Indio	NE Cor.Sec6 T7S,R8E,SBBM		8.56	5- -19	[illegible]	669.42		117.73	[illegible]									
III	Sacramento	3	A	Auburn Road	Northerly Boundary	OC	1.86	5-26-14	3,100.94		622.81	[illegible]	[illegible]					208.60	1,309.96		[illegible]	5.58Mi. taken over from County 12-10-18.
	"	3	B	Sacramento City Limits	Sylvan School	OC	3.48	10-22-15	120,035.86	11,628.93	9,421.61	7,952.04	29,002.58	35,946.42	5,161.80	669.88	41,778.10	40,186.32	8,551.19	567.39	49,254.90	Taken over from County 6-28-16.
	"	4	A	Southerly Boundary	McConnell Station		7.38		39,194.19	3,338.60	1,518.44	[illegible]	6,982.86	2,945.59	1,487.88	27,768.16	32,211.63					" " " " 8-10-18.
	"	4	B	McConnell's Station	Sacramento		23.60		59,118.94	21,093.00	[illegible]	[illegible]	[illegible]	276.24	555.58	29.45	901.24					" " " " 7- 7-18.
	"	11	A	Westerly Boundary	Folsom		6.63	11-9-15	2,660.23		30.00	1,179.61	2,660.23									
	"	11	B	Folsom	Sacramento		17.30	7-7-15	62,598.50	19,612.73	11,898.97	[illegible]	37,171.83					20,100.68	3,097.42	1,768.97	25,426.67	" " " " 7- 7-15.
V	San Benito	2	A	Northerly Boundary	S.Westerly Boundary	OC	4.70	6-1-16	32,813.79	3,154.04	4,065.86	9,129.30	16,351.20	1,256.75	1,922.68	12,074.36	15,253.79		1,208.80		1,208.80	
VII	San Bernardino	22	A	San Juan Bautista	Hollister		7.09		38,444.66	[illegible]	5,646.08	[illegible]	9,479.53	13,889.34	4,898.11	10,227.68	28,946.13					" " " " 11- 9-18.
	"	9	A	Upland	Citrus Avenue	OC	10.36	3-23-15	11,408.86	[illegible]	[illegible]	[illegible]	11,319.04	8.56	80.29		[illegible]					
	"	9	B	Citrus Avenue	Rialto	OC	4.02	8-11-14	3,921.29	[illegible]	[illegible]	[illegible]	[illegible]									
	"	9	C	Rialto	San Bernardino	OC	1.63	8-11-14	6,602.17	[illegible]	[illegible]	[illegible]	[illegible]	334.19	472.71	1,538.77	2,345.67					
	"	9	D	Westerly Boundary	Upland	OC	2.25	11-24-14	2,346.60	[illegible]	[illegible]	[illegible]	[illegible]									
	"	19	A	Westerly Boundary	Ontario	TenC	2.13	6-23-14	[illegible]	612.07	1,342.13	[illegible]	[illegible]	322.20	14,474.58	2,032.60	16,829.58					
	"	19	B	Ontario	Southerly Boundary	OC	4.48	6-23-14	10,122.22	[illegible]	6,418.27	[illegible]	[illegible]						962.04	11.96	934.80	Topeka Surface placed 11-27-15.
	"	31	A	San Bernardino	Devore	CB	7.77	12-19-18	742.45	60.78	109.71	[illegible]	742.45									Taken over from County 12-19-18.
	"	31	B	Devore	Summit		15.17	12-19-18	2,656.77		1,616.68	1,040.09	2,656.77									" " " " "
	"	43	A	Arrowhead End County Pav	Big Bear Lake		49.20	8-1-17	24,960.47	222.78	[illegible]	[illegible]	24,960.47									" " " " 8- 1-17.
VII	San Diego	2	A	N. City LimitsSanDiego	"C"St. Encinitas	OC	8.41	9-22-13	37,277.60	2,364.30	2,978.98	[illegible]	[illegible]	[illegible]	20.09	18,992.82	20,602.43			[illegible]	108.04	Oil Surface placed 2- -15.
	"	2	B	"C"St. Encinitas	South City Limits of Oceanside	OC	10.73	7-21-14	16,649.28	1,933.71	1,795.79	[illegible]	14,304.68	[illegible]	54.22	1,402.62	4,344.40					
	"	2	C	N.CityLimits Oceanside	1Mi.N.LasFlores Station	OC	8.03	8-11-14	90,183.54	[illegible]	2,389.14	[illegible]	19,946.26	[illegible]		131.80	366.10	5,345.28		[illegible]	[illegible]	" " " " 12- -15.
	"	2	D	1Mi.N. Las Flores Sta.	Northerly Boundary	OC	11.90	7-30-15	11,869.23	380.63	2,180.38	[illegible]	[illegible]	[illegible]			[illegible]					

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MOTOR VEHICLE FUND EXPENDITURES.

Dis.	County	Rte.	Sec.	From	To	Type	Miles under Maint.	Date Completed	Total	General Maintenance				Improvement				Reconstruction				Remarks
										Pavement Base	Pavement Surface	Miscellaneous	Total	Pavement Base	Pavement Surface	Miscellaneous	Total	Pavement Base	Pavement Surface	Miscellaneous	Total	
VII	San Diego	12	A	San Diego	E. Boundary La Mesa	OC	1.97	11-24-14	5,467.65	2,123.46	953.91	2,390.28	5,467.65									
	"	12	B	La Mesa	E. Boundary El Cajon	OC	1.55	8-21-15	1,767.42	87.54	386.05	1,294.83	1,767.42									
	"	12	C	El Cajon	Alpine	CB	7.31	6- -15	10,367.63	1,181.79	628.03	8,557.81	10,367.63									
	"	12	D	Alpine	Pine Valley	CB	2.17	8-19-18	20,502.99	256.81	188.78	17,678.21	18,057.24							2,445.75	2,445.75	CB under construction.
III	San Joaquin	4	A	Southerly	Manteca	CB	4.11		21,071.49	877.50	3,317.42	16,576.57	21,071.49									CB taken over from County 12-10-18.
	"	4	B	Manteca	Stockton	CB	10.43	4-17-20	51,706.81	40,544.71	9,827.42	974.84	51,346.97	35.82			35.82	36.52	243.89	41.61	324.02	CB taken over from County 12-10-18.
	"	4	C	Stockton	Houston School	CM	14.1		29,660.55	5,927.95	8,821.52	3,594.17	18,343.64					390.79	220.36	10,705.96	11,316.91	" " " " " 10- 5-15.
	"	4	D	Houston School	Northerly Boundary	CM	4.06	6- 5-20	149.54	30.74	118.80		149.54									1.40 Mi. of AC with Concrete Shoulders.
	"	5	A	Easterly Boundary	Santa	CM	1.54		14,164.82	4,756.93	6,039.67	3,346.16	14,142.76							22.06	22.06	CM taken over from County 10- 5-15.
	"	5	B	Santa	Stockton	CM	7.92	6- 5-20	29,714.43	3,990.51	5,583.47	13,302.95	22,876.93						197.15	6,940.35	7,137.50	
V	San Luis Obispo	2	A	Northerly Boundary	Paso Robles	CB	7.1		7,014.90	1,674.00	737.80	4,603.10	7,014.90									
	"	2	B	Paso Robles	Atascadero Creek	CB	5.1	8-24-15	7,767.81	2,202.12	743.13	4,824.56	7,767.81									
	"	2	C	Atascadero Creek	Santa Margarita	CB	6.1	6- 9-15	8,377.06	2,794.62	1,423.76	4,656.68	8,377.06									
	"	2	D	Santa Margarita	San Luis Obispo	CB	7.0	4- 7-15	59,910.82	3,433.17	8,045.49	14,493.70	25,972.36	2,092.75	1,167.69	29,384.31	32,644.75		292.40		292.40	
	"	2	E	San Luis Obispo	Arroyo Grande	CB	7.05	6-20-15	29,135.07	5,508.36	3,591.98	11,451.04	20,551.38	1,872.04	235.49	6,422.24	8,479.77					Oil Surface placed 5-6-19.
	"	2	F	Arroyo Grande	Southerly Boundary	CB	5.11	8-31-15	12,186.33	1,957.73	463.04	1,511.14	3,931.91	916.91	52.15	7,259.36	8,228.42					
	"	33	C	1Mi.N.Division Durango Cts	Easterly Boundary	F	1.0	12- 4-19	45.39		45.39		45.39									
IV	San Mateo	2	A	Northerly Boundary	San Mateo City	CM	5.1	12- -14	30,211.62	694.58	8,276.38	11,666.36	20,637.32		436.50	6,409.86	6,846.36		2,615.15		2,615.15	
	"	2	B	San Mateo City	Southerly Boundary	AC	7.31		49,373.31	6,218.32	7,561.60	8,802.25	22,582.17	193.00	27.84	23,912.50	24,133.34	1,642.48	902.61	112.71	2,657.80	
V	Santa Barbara	2	A	Northerly Boundary	1Mi.N. of Bicknell	CB	9.1	4-15-15	29,686.47	942.18	1,441.46	3,576.24	5,959.88	1,302.86	2,700.02	19,823.71	23,826.59					
	"	2	B	1 Mi. N. of Bicknell	Los Alamos	CB	11.2	1- -15	14,249.27	1,577.88	1,044.44	6,655.11	9,277.43	901.99		4,040.30	4,942.29					
	"	2	C	Los Alamos	Zaca Station	CB	10.0	8-31-15	9,253.91	522.25	11.17	1,709.38	2,243.80			7,009.45	7,009.45					
	"	2	D	Zaca Station	Gaviota Pass	CB	10.0	8-31-15	9,253.91	493.56	11.17	1,654.14	2,158.87			7,094.41	7,094.41					
	"	2	E	Gaviota Pass	Alcatraz School	CB	4.1	4-15-15	20,671.98	10,166.44	867.14	14,651.40	25,684.98	5,586.92	85.72	6,949.41	12,563.05					
	"	2	F	Alcatraz School	El Capitan Creek	CB	10.1	11-23-15	29,621.69	5,835.56	527.13	10,630.60	17,093.28	7,136.87	161.22	6,230.32	13,528.41					
	"	2	G	El Capitan Creek	Glen Anne Canyon Road	CB	10.0	11-30-15	41,835.25	1,967.94	727.88	13,305.58	16,001.40	7,920.14	1,710.59	20,873.87	30,504.60					
	"	2	H	Carpinteria	Southerly Boundary	AC	7.31		5,358.16	1,564.77	793.72	2,899.67	5,358.16									Taken over from County 11-23-16.
	"	2	I	Glen Anne Canyon Road	Stony Creek	OC	2.94	6-27-14	6,614.21	1,886.28	524.69	623.64	3,044.21									Oil Surface placed 5- -17.
	"	2	J	Stony Creek	Carpinteria	OC	4.76	11- -17	14,641.43	10,057.37	1,299.89	2,779.36	14,136.62									CB completed 11-9-15.
	"					CB	1.97	11- -17														Taken over from County 11-23-16.
																						Oil Surface placed 5- -17.
IV	Santa Clara	2	K	Stony Creek	Santa Barbara	AC	7.72		17,666.81	9,948.53	2,190.20	5,532.08	17,660.81									
	"	2	A	Northerly Boundary	San Jose	TrC	9.24	9-24-13	54,671.85	4,113.94	12,139.81	5,311.72	21,565.47	6,059.74	46,661.06	4,897.11	57,627.91		417.49		417.49	Topsoil Surface placed 8-23-14, 2-16-18.
	"	2	B	San Jose	Morgan Hill	CM	13.36	11-17-14	96,182.94	12,849.42	26,829.36	5,420.46	45,099.24	1,533.36	34,555.23	14,995.11	51,083.70					
	"	2	C	Morgan Hill	Southerly Boundary	OC	11.37	7- 2-15	52,274.38	8,851.01	7,578.92	5,538.37	21,968.30		236.08		236.08					CB completed 8-23-14, TrmC placed 6-19-17, 7-8-18.
	"	3	A	Northerly Boundary	San Jose	OC	7.31	7- 2-15	34,511.22	767.48	12,007.33	3,675.99	16,450.77	7.08	1,365.37	13,182.69	14,555.14		2,297.15	1,008.16	3,305.31	
	"	5	B	San Jose	Southerly Boundary	CB	6.16	12- -16	47,848.40	1,842.25	12,844.69	14,213.90	28,900.84	84.22	9,110.18	9,753.16	18,947.56					
IV	Santa Cruz	5	A	Easterly Boundary	Santa Cruz	CB	16.15	7-26-16	73,897.01	1,018.70	22,115.01	20,215.98	43,349.69	1,797.13	19,490.69	9,259.50	30,547.32					TrmC placed 11-10-17.
	"	42	A	Santa Cruz-Capitola	Redwood Pk.	CB	15.27	12-15-19	30,670.01	3.09	20,812.86	7,411.04	28,226.99		2,443.02		2,443.02					Taken over from State Hwy. Dept. 7-27-17.
II	Shasta	3	A	Southerly Boundary	Redding	CB	1.26		1,360.79		1,360.79	20.33	1,381.12									Cottonwood Creek approaches 2-4-20.
	"	3	B	Redding	Bend	CB	12.73	11- 4-15	45,497.98	73.24	10,280.67	12,640.35	23,394.26		22,945.00	156.06	23,103.06					10.23 Mi. completed 8-13-19.
	"	3	C	Bend	La Moine	CB	11.23	10- 5-15	37,098.96		13,006.96	13,335.91	26,342.87		5,355.10	65.84	5,420.94					11.23 Mi. completed 11-6-19.
	"	3	D	La Moine	Southerly Boundary	CB	21.04		89,766.41	.55	15,225.41	10,000.01	25,226.97		56,932.32	8,284.44	65,216.76					11.81 Mi. completed 11-6-19.
	"	3	E	Southerly Boundary	Stella	CB	5.09		9,350		6,744.41	444.84	7,189.25									Under construction.
	"	3	F	Stella	Redding	CB	9.30		17,191		576.30	1,413.76	1,990.06									
	"	3	G	Ingot	Mad River Creek	CB	4.27	4-27-17	23,310.46		1,167.14	5,501.94	6,669.08		46.08	23,264.38	23,310.46					
II	Sierra	3	A	Easterly Boundary	Downieville	CB	17.33		41,231.36		286.30	2,346.78	2,633.08			39,698.28	39,698.28					" " " "
III	Sierra	3	A	Nevada County Line	Slate Lime	CB	12.50		27,224.85		2,201.32	2,997.06	5,198.38									Established by Statute 7-22-19.
II	Sierra	3	A	Southerly Boundary	Loyd	CB	18.12	12-21-15	29,939.40		706.36	4,071.09	4,777.45		24,436.65	122.50	24,559.15					Under construction.
	"	3	B	Loyd	Truckee	CB	10.76		24,010		24,010		24,010									
	"	3	C	Truckee	Oregon Line	CB	63.43	12-21-15	63,435.95		16,654.32	14,033.43	30,687.75	131.65	37,355.06	1,467.25	38,953.96					
III	Solano	4	A	Benicia	2-1/2 Mi.S.of Cordelia	CB	9.15	2-24-15	4,282.57	942.68	1,454.26	1,885.63	4,282.57									
	"	4	B	2-1/2Mi.S.of Cordelia	Fairfield	CB	8.13	10- 5-15	19,797.09	1,967.69	10,454.83	5,446.12	17,868.64		1,948.45		1,948.45					
	"	4	C	Fairfield	Vacaville	CB	8.69	7- 7-15	10,379.75	3,504.04	2,666.27	4,209.44	10,379.75									
	"	4	D	Vacaville	1 Mi. N.E. of Rotevia	CB	8.29	1-11-16	6,345.88	2,716.65	276.79	3,352.44	6,345.88									
	"	4	E	1 Mi. N.E. of Rotevia	Northerly Boundary	CB	9.40	6-24-16	5,921.07	3,152.13	1,619.15	1,149.79	5,921.07									
	"	8	A	Easterly Boundary	Ste. 7 mi Cordelia	CB	3.45	1- 5-15	4,274.72	485.84	40.26	3,748.62	4,274.72									

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MOTOR VEHICLE FUND EXPENDITURES.

Div.	County	Rte.	Sec.	From	To	Type	Miles Under Maint.	Date Completed	Total	General Maintenance				Improvement				Reconstruction				Remarks
										Pavement Base	Pavement Surface	Miscellaneous	Total	Pavement Base	Pavement Surface	Miscellaneous	Total	Pavement Base	Pavement Surface	Miscellaneous	Total	
IV	Sonoma	1	A	Northerly Boundary	Healdsburg		4.32	7-30-18	22,000.10	120.34	7,830.99	2,467.41	10,118.74	282.74	11,365.08	10,246.82	21,909.44					
	"	1	B	Healdsburg	Santa Rosa		11.10	11-10-16	21,580.34	1,334.64	4,790.19	8,469.57	14,594.40		397.64	4,198.82	4,596.46					
	"	1	C	Santa Rosa	Sonoma County Line		16.84	7- 6-20	23,572.04	6,424.03	2,242.89	8,488.32	17,160.24	486.62	902.42	2,022.86	4,411.80					6.44 Mi. completed 12-21-15.
	"	3	A	S.W. County Line	Sonoma Creek		11.15	7- 1-19	20,147.93	260.90	12,218.28	10,983.19	23,462.37		2,717.00	2,044.50	4,761.50					
	"	3	B	Sonoma Creek	Petaluma Boundary		4.41	7- 1-20	7,173.80	292.99	4,198.31	1,779.26	6,270.56	313.01	559.93	1,760.80	2,633.74					
III	Stanislaus	4	A	Southerly Boundary	1-1/2 Mi.N. of Ceres		5.96	5-20-15	141,894.14	5,976.36	5,958.31	5,004.50	17,939.17	75,782.28	51,906.14	13,703.82	143,392.24					Tom completed 2-6-20.
	"	4	B	1-1/2 Mi.N. of Ceres	Northerly Boundary		3.96	6-29-14	21,058.22	3,015.27	4,664.46	5,467.69	12,366.06			8,690.16	8,690.16					
	"	12	A	Salida	Oakdale		14.00	10-10-16	9,552.03	1,080.36	474.26	3,336.37	5,890.99									
	"	12	B	Oakdale	S.Easterly Boundary		11.72		2,778.97	179.97	105.03	294.44	579.44									Under const. Grading completed 10-9-15.
III	Sutter	3	A	Yuba City	Northerly Boundary		11.71	1-11-16	2,778.97	1,340.78	340.00	1,238.92	2,778.97									
II	Tehama	3	A	Southerly Boundary	Los Molinos		11.72		119.79		53.07	66.72	119.79									Under construction.
	"	3	B	Tehama Junction	Red Bluff		10.46	10-10-17	2,982.79	24.14	1,958.98	1,299.67	2,982.79									
	"	3	C	Red Bluff	Northerly Boundary		12.82	7-11-16	22,615.55		7,029.34	1,783.84	8,800.18		13,806.36		13,806.36					
	"	7	A	Southerly Boundary	Tehama Junction		11.49	6-25-15	4,050.41	208.82	2,988.30		963.59	4,050.41								Oil Surface placed 12-28-15.
II	Trinity	20	C	Easterly Boundary	McDonald's Ranch		12.93		3,242.64		163.48	3,079.16	3,242.64									Taken over from U.S.ForestServ.9-18-19.
	"	35	A	Ranch	Tunnel		21.20		14,195.69		1,174.00	13,021.69	14,195.69									Taken over from State Eng.Dept.7-27-17.
VI	Tulare	4	A	Southerly Boundary	Sec.17,T22 S, R25 E.		12.26	7- 6-18	3,321.36	663.56	775.34	1,734.47	3,173.37									
	"	4	B	Sec.17,T22 S, R25 E.	Tulare		12.79	10-10-19	2,142.56	496.41	142.56	1,369.59	2,008.56	120.17		1.84	122.01					
	"	4	C	Tulare	1/4 Mi.N. of Visalia		9.24	12-10-18	1,466.58	263.39	76.34	1,126.51	1,466.24									
	"	4	D	1/4 Mi.N. of Visalia	Goshen		4.24	7-26-16	4,440.53	1,540.97	774.29	2,133.09	4,448.35									Tom under construction.
	"						3.20	7-26-16														
	"	4	E	Goshen	Northerly Boundary		12.96	11-10-16	7,227.46	1,824.11	537.49	4,865.86	7,227.46									
	"	10	A	Easterly Boundary	S.P.RR 2 Mi.S.of Goshen		3.96	7-11-16	778.91	207.36	66.66	492.89	766.91									Oiling in progress.
	"	10	B	1/4 Mi.S. of Visalia	Visalia		1.27	7-11-16	82.01	4.47	36.26	41.28	82.01									
III	Tuolumne	13	A	Easterly Boundary	1 Mi.E. of Keystone		10.94		5,795.68	1,151.50	305.24	4,339.34	5,796.08									
	"	13	B	1 Mi.E. of Keystone	Sonora		11.12	9-11-16	39,664.09	1,336.36	1,909.28	26,819.68	31,760.96	2,384.79		5,508.33	7,893.12					Established by Stgtute 7-27-19.
	"	13	C	Sonora	Foley's Ranch		8.82		3,156.14	88.10	7.21	1,062.85	1,158.16									Taken over from State Eng.Dept.7-27-17.
	"	13	D	Foley's Ranch	Long Barn		11.00		3,441.67			3,441.67	3,441.67									
	"	13	E	Long Barn	Strawberry		11.20		3,643.97	11.20	18.41	3,614.36	3,643.97									
	"	13	F	Strawberry	Niagara		14.45		2,962.44		325.19	1,977.26	2,302.44									
	"	13	G	Niagara	Rakes		15.30		1,497.92			1,497.92	1,497.92									
	"	13	H	Rakes	Easterly Boundary		3.40		548.46			548.46	548.46									
	"	18	A	Rte. 40 near Sagouis	Yosemite Nat'l Park		8.40		76.46			76.46	76.46									
	"	40	A	Mountain Pass Rte. 13	Tuolumne River		10.30		16,305.16	1,606.58	876.66	13,228.94	15,712.18			686.02	686.02					
	"	40	B	Tuolumne River	Groveland		10.30		9,491.34	447.13	119.97	8,924.24	9,491.34									
	"	40	C	Groveland	Southerly Boundary		9.40		5,466.69	224.06	236.02	4,982.69	5,442.77									
	"	40	D	Southerly Boundary	Summit Mt.W.Harden Ranch		9.40		3,166.09		190.13	2,976.71	3,166.84									
	"	40	E	Summit Mt.W.Harden Ranch	Junction Rte. 18		9.50		4,978.82	286.76	342.56	4,349.03	4,978.35									
	"	40	F	Junction Rte. 18	Yosemite Nat'l Park		9.10		3,193.26		212.00	2,981.41	3,193.41									
VII	Ventura	2	A	S.Easterly Boundary	Newbury Park		7.25	6-23-14	6,040.94	564.41	4,131.88	1,344.65	6,040.94									Oil Surface completed 1-1-15.
	"	2	B	Newbury Park	Springville		4.26	7- -15	35,435.13	1,724.22	5,930.14	5,734.96	13,389.32	299.55	124.74	5,417.89	5,842.18	879.60		15,344.03	16,223.63	
	"	2	C	Springville	Ventura		8.90	11-19-17	17,535.33	678.48	738.57	2,074.18	3,491.23		2,892.44		2,892.44			11,151.66	11,151.66	
	"						0.08															
	"	2	D	Ventura	Padre Juan Canyon		6.07	- -15	2,964.19	99.54	863.14	2,337.47	2,964.15									
	"	2	E	Padre Juan Canyon	Sea Cliff		4.95	- -15	3,443.96	379.74	809.36	2,254.31	3,443.41			744.64	744.64					
	"	2	F	Sea Cliff	Rincon El Rincon		7.54	6- -15	12,798.74	113.88	767.90	11,907.96	12,789.74									
	"						1.52															
	"	2	G	Rincon El Rincon	Easterly Boundary		5.49	- -15	2,624.36	138.43	431.76	2,054.17	2,624.36									
III	Yolo	6	A	2 Mi.S. of Davis	Yolo Trestle		5.49	11-10-16	10,812.32	1,815.70	3,224.42	5,572.20	10,612.32									
	"	6	B	Yolo By-pass	West Sacramento Levee		2.00	7-10-16	4,241.42	338.51	1,507.89	2,395.02	4,241.42									
	"	6	C	West Sacramento Levee	Sacramento River		2.43	5-20-16	11,669.95	411.12	5,202.11	5,672.64	11,285.87		136.95	247.13	384.08					
	"						1.13	5-15-18														
	"	7	A	Southerly Boundary	Woodland		11.83	5-17-15	7,547.28	767.88	3,880.70	3,198.70	7,547.28									
	"	7	B	Woodland	Zamora		10.70		136.81		109.73	27.09	136.81									Under construction.
	"	7	C	Zamora	Northerly Boundary		10.50	7- 1-20	6,360.00		6.38	354.00	360.38									
III	Yuba	3	A	Southerly Boundary	Harrison's Crossing		2.46	6-24-19	2,980.80	974.75	108.25	2,717.54	2,800.54									
II	"	32	A	Harrison's Crossing	Marysville		9.46	6-24-19	30,971.92	2,404.34	2,229.36	9,344.11	14,177.71	5,141.14	8,861.41	2,601.66	16,604.21					
	"	32	B	S. Boundary Yuba River	Easterly Boundary		11.07		4,936.68		1,445.83	2,598.40	3,844.23		21.95	1,070.50	1,092.45					Not complete.
II	Butte	20	A	Near Merrimac					171.13							171.13	171.13					Preliminary Survey. Route abandoned
	"	30	B	"					1,056.98							1,056.98	1,056.98					
					Grand Total		3,105.17		5,118,809.69	487,038.68	884,796.04	1,564,656.04	2,956,490.76	481,416.65	683,984.03	719,008.86	1,884,409.54	107,333.94	30,902.00	139,373.45	277,609.39	

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APPENDIX S.

Map of California Showing State Highways.

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